DOC NO. TWR-17546 VOL III REV A

TITLE L623-FY91-M020

Flight Set 360L007 (STS-33)
Insulation Component Final Report
Volume III
Final Release

August 1990

Prepared by:

S. Hicken
Thermal Insulation Design

Approved by:

F. Baugh, Supervisor
Thermal Insulation Design

L. Allred
Integration Engineer

S. Marsh
Insulation Program Manager

Dolores Mills 9-26-90
Release
ECS SS-1015

Thiokol CORPORATION
SPACE OPERATIONS

P.O. Box 707, Brigham City, UT 84302-0707 (801) 863-3511

ACTIVE PAGE RECORD

PAGE NO.	REVISION	PAGE NO.	REVISION	PAGE NO.	REVISION	PAGE NO.	REVISION
A	All						

REVISION DESCRIPTION

REV LTR	DATE	DESCRIPTION
A	Aug 1990	This revision adds the thermal safety factor analysis, factory joint inspections, and edge separation evaluation to the interim report.

ABSTRACT

Volume III of this postfire report deals with the insulation component of the RSRM. The report is released twice for each flight set. The interim release contract date is on or before 60 days after the last field joint or nozzle to case joint is disassembled at KSC and contains the results of the KSC visual evaluation. The data contained in the Volume III interim release supersedes the insulation data presented in the KSC 10 day report. The final release contract date is on or before 60 days after the last factory joint is disassembled at the Clearfield H-7 facility and contains the results of all visual evaluations and a thermal safety factor analysis. The data contained in the Volume III final release supersedes the interim release and the insulation data presented in the Clearfield 10 day report.

CONTENTS

CONTENTS (Cont)

CONTENTS (Cont)

FIGURES

FIGURES (CONT'D)

TABLES

TABLES (CONT'D)

Appendix A

Appendix A (Cont'd)

Appendix B

Appendix B (Cont'd)

ACRONYM LIST

ASF	-	Actual Safety Factor
CEI	-	Contract End Item
CF/EPDM	-	Carbon Fiber Filled EPDM
CSF	-	Compliance Safety Factor
DFI	-	Development Flight Instrumentation
DR	-	Discrepancy Report
EMT	-	Engineering Management Team
EPDM	-	Ethylene Propylene Diene Monomer
ET	-	External Tank
E.T.	-	Exposure Time
FRR	-	Flight Readiness Review
HPM	-	High Performance Motor
I.D.	-	Inside Diameter
IFA	-	In Flight Anomaly
KSC	-	Kennedy Space Center
M + 3σ	-	Median Plus Three Times The Standard Deviation
MDD	-	Material Decomposition Depth
MDR	-	Material Decomposition Rate
MDT	-	Minimum Design Thickness
NBR	-	Acrylonitrile Butadiene Rubber
PEEP	-	Postfire Engineering Evaluation Plan
PFAR	-	Postfire Anomaly Record
PR	-	Problem Report
PSI	-	Pounds Per Square Inch
RPRB	-	Redesign Program Review Board
RSRM	-	Redesigned Solid Rocket Motor
SRB	-	Solid Rocket Booster
SRM	-	Solid Rocket Motor
STS	-	Space Transportation System
TPS	-	Thermal Protection System

1.0 INTRODUCTION

STS-33 was launched from KSC pad 39B on 22 November 1989. Two of the Redesigned Solid Rocket Motors were part of the launch system and were designated RSRM-7A (360L007A) and RSRM-7B (360L007B). Both motors incorporated the redesigned nozzle to case joint and case field joint as shown on Figure 1. Following booster separation and splashdown, the motors were recovered and returned to Cape Canaveral Hangar AF for disassembly and inspection.

Following the inspection at Hangar AF, the segments were returned to the Thiokol Corporation H-7 refurbishment facility. There, the insulation thicknesses were measured, and the factory joints were disassembled. The documentation of these inspections and the insulation thermal performance evaluation (material decomposition safety factor) have been added to this final release of the report.

In an attempt to standardize and document the evaluation of flight RSRMs, a Postflight Engineering Evaluation Plan has been written (References 1 and 2). The PEEP outlines the basic evaluations to be performed. Appropriate procedures contained in this plan were used to evaluate the internal and external insulation. Addendums to the PEEP were written which outline additional evaluations to be performed on the RSRM-7A and RSRM-7B motors to assess conditions documented on prefire discrepancy reports (References 3 and 4). The intent of these procedures was to insure that all pertinent evaluation points were examined and documented in a consistent and complete manner.

2.0 OBJECTIVES

The objective of this report is to document the postflight condition of the internal and external insulation and evaluate the material decomposition safety factors of the RSRM-7A and RSRM-7B internal insulation. An additional objective of this document is to discuss the Insulation Component Program Team assessment of the observations.

3.0 SUMMARY

A summary of the RSRM-7A and RSRM-7B external and internal insulation condition is found below. A detailed description of the results can be found in Sections 6.0 through 9.0.

3.1 EXTERNAL INSULATION

3.1.1 Factory Joint Weatherseals

Two of the fourteen weatherseals on this flight set exhibited unbonds.

The RSRM-7A aft segment stiffener to stiffener factory joint weatherseal was unbonded on the aft edge for approximately 70% of the circumference. The depth of the unbond measured from 0.8 to 0.9 inch which was to the pin retainer band. The unbond exhibited Chemlok 205 to case failure. Water was dripping from the unbond, and corrosion was evident under the unbond. There was no evidence of soot or heat effects on the unbonds. Paint was peeled up from the case and attached to the edge of the weatherseal intermittently along the unbond. Corrosion was evident on the case under the peeled paint. A small forward edge unbond was also noted near 310° and measured 0.5 inch longitudinally by approximately 0.75 inch circumferentially.

Two insulation to case unbonds were identified on the forward edge of the RSRM-7B forward segment cylinder to cylinder weatherseal. The weatherseal was unbonded centered at 160° for 14 inches to a depth ranging from 1.0 to 1.5 inches. The paint was also peeled and missing from the case in the area forward of the weatherseal in two places. The occurrences measured 2.4 inches longitudinally by 5 inches circumferentially and 3.25 inches longitudinally by 7 inches circumferentially. The forward edge of the weatherseal was also unbonded centered at 135° for 11 inches to a depth of 0.1 inch. An aft edge unbond was noted at 210° and measured 0.6 inch longitudinally by approximately 1 inch, circumferentially. All unbonds were at the Chemlok 205 to case interface.

The other factory joint weatherseals appeared to be in excellent condition. Normal heat effects and discoloration were evident on the weatherseals of both aft segments, and normal debris impact damage from re-entry was evident intermittently on the aft edges of the weatherseals.

No significant areas of missing EPDM insulation were noted. The K5NA closeouts over the thermocouple wires were in good condition, with no evidence of water leaking from any of the these locations.

3.1.2 Stiffener Stubs and Rings

The insulation over the stiffener stubs and rings was in good condition. Normal heat effects and discoloration were evident on all surfaces in the 220°-270°-320° region. There were no significant areas of missing material. The EPDM was well bonded to the stiffener stubs and appeared to be well bonded to the stiffener rings. There was very little stiffener ring damage since the sea state was high at splashdown. The K5NA repair on the outboard edge of both forward stiffener stubs showed normal erosion and some small missing chunks intermittently around the circumference.

3.2 NOZZLE TO CASE JOINTS

Based on the visual evaluation, both nozzle to case joints performed well. No gas paths through the polysulfide adhesive were identified. The RSRM-7A polysulfide bondline failed 83% cohesively at disassembly while the RSRM-7B bondline failed 89% cohesively at disassembly.

One small void in the polysulfide was identified on the RSRM-7A joint at 109° and measured 1.6 inches longitudinally by 0.25 wide. The void extended across the step but did not extend to the wiper O-ring and was not penetrated by hot gas. Porosity was evident on both joints in the step region. The average polysulfide vent slot fill was 32% on RSRM-7A and 84% on RSRM-7B.

3.3 FIELD JOINTS

The internal insulation in all six of the case field joints performed as designed, and no anomalous conditions were identified. J-leg tip contact was evident full circumference at each joint. Wet soot deposits extending down the bondline were noted on all of the RSRM-7 field joints, generally to a depth of 0.2 to 0.7 inch radially into the bondline (outboard from the remaining material). The maximum depth of the wet soot was 1.35 inches on the RSRM-7B center field joint. No heat

effects were evident under the soot. Similar wet sooting has been noted on previous RSRM joints and is believed to occur at re-entry or splash-down during joint flexing.

There were no clevis edge separations that were recordable (over 0.10 inch depth). Some tang edge separations were visible on the field joints. The tang insulation edge separations were probed during postflight inspection at Clearfield H-7. The deepest postfire tang edge separation had a depth of 0.25 inch as compared with no prefire separation. These separations are documented in Tables 5 and 6.

Clevis insulation cracks were noted on the radius region insulation on four of the six field joints. Some cracks were noted on prefire Problem Reports. The cracks did not have any effect on the function of the joint.

3.4 IGNITER JOINTS AND INSULATION

The condition of the igniter boss insulation was excellent. An evaluation of both RSRM-7A and RSRM-7B igniter boss insulation to case interfaces revealed no edge separations. The molded insulation surface was in good condition, and both joints exhibited normal erosion on the inboard surface. One blowhole through the putty was present on the RSRM-7A igniter to case joint at 332°. The putty in the RSRM-7B joint had no blowholes, however, putty was extruded up to the adapter full circumference and onto the aft face of the adapter intermittently around the circumference.

The RSRM-7A igniter adapter to igniter chamber joint was in good condition with no blowholes. The igniter adapter to igniter chamber joint on the RSRM-7B had a blowhole through the putty at 340°. Soot was in the putty from 315° to 350° but did not extend to the gasket. No adverse effects on the performance of the joint resulted from either of the blowholes.

3.5 INTERNAL ACREAGE INSULATION

The acreage insulation, including the internal insulation over each of the factory joints, was in good condition. No evidence of hot gas penetration through the insulation was identified.

3.5.1 Aft Segments

Four to six small blisters were identified in the CF/EPDM in the RSRM-7A aft dome. The largest blister measured 1.75 inches axially by 0.25 inches circumferentially. This was significantly less than was seen on the previous flight set and is considered a normal condition.

The aft segment NBR inhibitor stubs exhibited scalloped erosion around the circumference. These areas had a very short inhibitor stub with intermittent inhibitor pieces taller than adjacent areas. This condition has been noted on all previous flight RSRM aft segments. This uneven erosion was not typically seen to this extent on HPM motors, but it does not appear to be a problem. There were no tears in either inhibitor.

The aft segment acreage insulation was in normal condition. There were no gouges, separations, cuts, missing material, excessive erosion, or other areas of blisters.

3.5.2 Center Segments

Only two inhibitor tears greater than 3 inches radially were noted in either aft center segment inhibitor stub. Both were noted on the RSRM-7B aft center segment and measured 4.0 and 4.5 inches in length.

Some radial tears were noted in the forward center segment NBR inhibitor stubs (nine on RSRM-7A and eight on RSRM-7B). The tears in the forward center segments ranged from 5.0 to 11.75 inches radially. The radial extent and frequency of the tears identified in the inhibitor stubs are within the range of tears noted on past flight motors. The edges of the tears demonstrated no material loss or erosion. This indicated that the tears occurred after motor burn.

The acreage insulation exhibited normal erosion. The castable inhibitor was completely missing on all four center segments. The flap and CF/EPDM was completely eroded to the flap bulb on the aft center segments and partially eroded on the forward center segments.

3.5.3 Forward Segments

The stress relief flap was present full circumference on both forward segments but was heat affected and eroded. The castable inhibitors were completely missing full circumference. The flaps had a scalloped appearance similar to that seen on previous RSRM flight forward segment flaps. The acreage insulation was in normal condition. The eleven point star pattern was easily distinguishable in the liner.

A detailed examination was performed on the insulation in both forward domes near the igniter boss to inspect for evidence of voids or thin insulation. No gas paths or areas of abnormal erosion were identified. The insulation in this area was also removed, and no indications of folds or voids at the insulation to case interface were noted. Dissection and evaluation of the two RSRM-7 igniter boss forward dome samples were completed and thickness measurements, void mapping, and photographs of the samples were done. In general, these insulation lay-ups looked very good. Inspection by Process Engineering showed there were only 6 to 10 small voids (typically 0.10 inch with 0.17 inch maximum diameter) and several small folds at the case surface for each layup.

3.6 INSULATION THERMAL PERFORMANCE

No unacceptable conditions were found in the thermal safety factor evaluation of the nozzle to case joints, field joints, factory joints, and case wall acreage areas. All safety factors exceeded the minimum requirements. A summary of minimum safety factors can be found in Tables 1 through 3.

4.0 CONCLUSIONS

During the KSC evaluation, Squawk forms were generated to report and track observations which violated the Postflight Engineering Evaluation Limits (Reference 1). The Squawks were reviewed by the SRB/SRM Post-flight Assessment Team, and some of the Squawks were elevated to PRs.

All observations presented in this document were reviewed by the Insulation Component Program Team to determine which observations were potential anomalies. The observations documented on PRs and Squawks

were automatically termed potential anomalies. The Insulation Component Program Team then classified each of the potential anomalies as 'critical', 'major', or 'minor' anomaly or 'remains observation' as defined per the Table 4 Redesign Program Review Board (RPRB) criteria.

4.1 KSC EVALUATION CLASSIFICATIONS

The Insulation Component Program Team identified two conditions observed at KSC which were considered potential anomalies:

'MINOR ANOMALY'

1. The RSRM-7A aft segment stiffener to stiffener factory joint weatherseal was unbonded on the aft edge for approximately 70% of the circumference. The unbond exhibited Chemlok 205 to case failure. A small forward edge unbond was also noted near 310°. The following documentation was written against these conditions:

   KSC Squawk I.D. number 33-026
   KSC PR PV6-146111
   PFAR 360L007A-04

   Two insulation to case unbonds were identified on the forward edge of the RSRM-7B forward segment cylinder to cylinder weatherseal. The weatherseal was unbonded at 160° for 14 inches and at 135° for 11 inches. A small aft edge unbond was noted at 210°. All unbonds were at the Chemlok 205 to case interface. The following documentation was written against these conditions:

   KSC Squawk I.D. number 33-024
   KSC PR PV6-145966
   PFAR 360L007B-01

   These unbonds are believed to be a result of surface contamination and do not represent a flight debris concern. A team has been established to evaluate weatherseal unbonds. The condition was classified as a 'minor' anomaly.

'REMAINS OBSERVATION'

2. Repair adhesive from a prefire clevis insulation separation repair was noted on the clevis ramp insulation of the RSRM-7A aft segment and on the tip of the clevis insulation of the RSRM-7B aft center segment. The following documentation was written against this condition:

   PFAR 360L007A-14
   PFAR 360L007B-26

Since the adhesive did not extend into the bonding region of the joint and did not affect the function of the joint, it was classified as 'remains observation'.

The Insulation Component Program Team presented their assessment of the observations shown in this document to the RPRB on 13 December 1989. The RPRB accepted the insulation team's classifications as presented.

4.2 H-7 EVALUATION CLASSIFICATIONS

The Insulation Component Program Team identified no conditions observed at Clearfield H-7 which were considered potential anomalies.

The Insulation Component Program Team presented their assessment of the Clearfield H-7 observations to the RPRB on 29 August 1990.

Insulation Design has concluded that the RSRM-7A and RSRM-7B insulation systems performed as designed.

5.0 RECOMMENDATIONS

The following recommendations are based on the results of the RSRM-7 postflight inspection.

5.1 KSC EVALUATION RECOMMENDATIONS

1. Increased controls should be implemented in the processing of the factory joint weatherseals to eliminate contamination and ensure adequate bond strengths are achieved.

2. M-111 planning should be reviewed to insure adequate precautions and inspections are made in conjunction with clevis insulation edge separation repairs.

5.2 H-7 EVALUATION RECOMMENDATIONS

1. Insulation thickness measurements need to continue to be screened and all outlying data re-measured and verified or corrected to ensure that safety factor violations do not occur due to bad data.

6.0 RSRM-7A VISUAL EVALUATIONS

During the postflight evaluation, Insulation Design documented the condition of the external factory joint weatherseals, stiffener rings, stiffener stubs, nozzle to case joint, case field joints, igniter to case

joint, segment acreage insulation, NBR inhibitors, and stress relief flap regions. A copy of this documentation for RSRM-7A can be found in Appendix A. The condition of the RSRM-7A insulation components is discussed in the following subsections.

6.1 RSRM-7A EXTERNAL INSULATION

6.1.1 RSRM-7A Factory Joint Weatherseals

Each factory joint weatherseal was visually inspected, and the results are recorded in Tables A-1 through A-7. No significant areas of missing EPDM insulation were noted on any factory joint weatherseal.

The weatherseals on all three aft segment factory joints were slightly heat affected from 220°-270°-320° due to the plume radiation from the solid rocket motors and shuttle main engines. The heaviest heat effects occurred near 270°. This is a normal occurrence that had no effect on the performance of the weatherseals.

The RSRM-7A aft segment stiffener to stiffener factory joint weatherseal was unbonded on the aft edge for approximately 70% of the circumference. The depth of the unbond measured from 0.8 to 0.9 inch which was to the pin retainer band. The unbond exhibited Chemlok 205 to case failure. There was no evidence of soot or heat effects on the unbonds. Paint was peeled up from the case and attached to the edge of the weatherseal intermittently along the unbond. Corrosion was evident on the case under the peeled paint and under the unbonded weatherseal. A small forward edge unbond was also noted near 310° and measured 0.5 inch longitudinally by approximately 0.75 inch circumferentially. This was the only joint which showed any moisture under the weatherseal.

Research of the manufacturing logs for the RSRM-7 factory joint weatherseals revealed that the Conscan readings for the RSRM-7A aft segment stiffener to stiffener weatherseal aft bonding surface were above current planning requirements. Results of the swab sample taken at KSC in the unbond revealed no measurable contamination.

A team has been established to evaluate the occurrence of weatherseal unbonds. Until this evaluation is completed and corrective action is taken, weatherseal unbonds are expected to continue to occur. It has

been analyzed and determined that the unbonds do not represent a flight concern; however, the resulting case corrosion problems are being dealt with by removing the weatherseals at Hangar AF.

The remainder of the RSRM-7A weatherseals were in excellent condition.

6.1.2 RSRM-7A Stiffener Stub and Rings

The condition of the insulation over the forward stiffener stub and the stiffener rings is recorded in Tables A-8 through A-11. The insulation was in good condition with normal heat effects and discoloration on all surfaces. The heaviest heat effects occurred from 220°-270°-320° due to the plume radiation from the solid rocket motors and shuttle main engines. No visible damage to any stiffener ring insulation was noted. This was due to the rough sea state at the time of booster splashdown. Some insulation unbonds were noted on the end of the ring segments after removal from the case. These unbonds were a result of the hydrolazing process.

The K5NA repair on the outboard edge of the forward stiffener stub showed normal erosion and some small missing chunks intermittently around the circumference.

6.2 RSRM-7A NOZZLE TO CASE JOINT

The nozzle to case joint insulation condition is recorded in Tables A-12 and A-13. The nozzle to case joint performed as expected with no polysulfide blowholes identified across the bondline. One small void in the polysulfide was identified at 109° and measured 1.6 inches longitudinally by 0.25 wide. The void extended across the step but did not extend to the wiper O-ring and was not penetrated by hot gas. Polysulfide porosity was evident in the step region full circumference.

The failure mode of the polysulfide bondline at disassembly was approximately 83% cohesive within the polysulfide, 15% adhesive at the NBR to polysulfide interface, and 2% adhesive at the phenolic to polysulfide interface. The vent slots showed an average polysulfide fill of 32% with values ranging from 0% to 100% fill.

The bondline around the circumference demonstrated erosion similar to that observed on previous RSRM motors. The polysulfide was decomposed further into the joint than the flap erosion. For approximately 0.40 inch aft of the erosion, the polysulfide was partially decomposed and bubbled. Although the material was partially decomposed, no gas flow occurred in the adhesive bondline decomposed region.

The insulation erosion in the joint region was similar to the condition of previous RSRM flight motors. The NBR flap and baffle appeared to be bonded in place and in excellent shape with normal heat effects and erosion.

6.3 RSRM-7A FIELD JOINTS

6.3.1 RSRM-7A Aft Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table A-14.

The general appearance of the pressure sensitive adhesive was noted. Contact within the joint was based on the flat appearance and matted texture of the adhesive, and non-contact was based on the glossy appearance of the adhesive. The joint appeared to have made contact full circumference at the tip of the J-leg. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 0.98 inch.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified.

Wet sooting into the joint bondline was essentially uniform full circumference to 0.30 to 0.40 inch outboard from the remaining material. Wet sooting similar to this has been seen on previous flight sets and is believed to occur during motor re-entry or splashdown when the joint may flex and allow soot into the bondline.

Cracks and crazing were also noted on the clevis insulation in the radius region at 38°, 82°, 140°, and 310°. Cracks on this segment were noted on a prefire PR. None of the cracks had any effect on the function of the joint.

Repair adhesive from a prefire clevis insulation separation repair was noted on the clevis ramp insulation at 245°. The adhesive measured approximately 1 inch long by 0.05 inch circumferentially by 0.01 inch thick. The adhesive did not extend into the bonding region of the joint and did not affect the function of the joint. Evaluation of the segment logs indicates that the edge separation repair was performed at Thiokol before shipment to KSC.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis edge separations were identified. Tang edge separations were visible on the aft field joint. The tang insulation edge separations were hard probed during postflight inspection at Clearfield H-7. The deepest postfire tang edge separation had a depth of 0.175 inch as compared with a prefire separation of 0.03 inch. These separations are documented in Tables 5 and 6.

6.3.2 RSRM-7A Center Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table A-15.

The general appearance of the pressure sensitive adhesive was noted. Contact and non-contact within the joint was based on the flat appearance and matted texture, or the glossy appearance of the adhesive. The joint appeared to have made contact full circumference at the tip of the J-leg. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 1.16 inches.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified.

Wet sooting into the joint bondline was noted full circumference ranging from 0.30 to 0.70 inch outboard from the remaining material. Wet sooting is believed to occur during motor re-entry or splashdown when the joint may flex and allow soot into the bondline.

Tape adhesive residue was noted intermittently on the clevis insulation surfaces and had no effect on the joint.

A small area of crazing was supposed to be at 158° on the clevis insulation in the radius region as defined on a prefire PR. The condition, however, could not be located.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis edge separations were identified. Tang edge separations were visible on the center field joint. The tang insulation edge separations were hard probed during postflight inspection at Clearfield H-7. The deepest postfire tang edge separation had a depth of 0.150 inch as compared with no prefire separation. These separations are documented in Tables 5 and 6.

6.3.3 RSRM-7A Forward Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table A-16.

The general appearance of the pressure sensitive adhesive was noted. The joint appeared to have made contact full circumference at the tip of the J-leg. The contact area appeared flat with a matted texture. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 1.16 inches.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified. No evidence of cracks or crazing was identified on the joint insulation surfaces.

Wet sooting into the joint bondline ranged from 0.30 to 0.60 inch outboard from the remaining material full circumference.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis edge separations were identified. Tang edge separations were visible on the forward field joint. The tang insulation edge separations were hard probed during postflight inspection at Clearfield H-7. The deepest post-fire tang edge separation had a depth of 0.210 inch as compared with no prefire separation. These separations are documented in Tables 5 and 6.

6.4 RSRM-7A IGNITER JOINTS AND INSULATION

The condition of the igniter to case joint insulation is recorded in Tables A-17 through A-20. The condition of the igniter boss insulation was excellent. An evaluation of the insulation to case interface revealed no edge separations. There was a small amount of loose flashing on the igniter boss near 60°. This is a fairly typical condition. The boss molded insulation surface was in good condition with normal erosion on the inboard surface.

The overall condition of the putty in the igniter to case joint was good. The color of the putty was a consistent light olive green. The putty exhibited 100% cohesive failure and nominal tack for the full circumference. There was one blowhole present through the putty at 332°. The blowhole was 1.15 inches circumferentially at the aft edge and 0.20 inch circumferentially at the forward edge. The blowhole resulted in soot on the metal surface forward of the putty full circumference. A map of the putty condition is shown in Figure 2.

The condition of the putty in the adapter to chamber joint was good. The color of the putty was a consistent light olive green. The putty exhibited 100% cohesive failure and good tack for the full circumference. No blowholes were noted in the putty of this joint.

The igniter internal and external insulation was in normal condition. No areas of blistering or abnormal erosion were present.

6.5 RSRM-7A ACREAGE INSULATION

6.5.1 RSRM-7A Aft Segment Acreage Insulation

The aft segment internal insulation was in excellent condition and is recorded in Tables A-21 through A-23.

The forward facing NBR inhibitor stub exhibited scalloped erosion intermittently around the circumference. These areas had a very short inhibitor stub with intermittent inhibitor pieces taller than adjacent areas. A similar condition has been noted on all previous RSRM flight aft segments. Measurements of the remaining inhibitor stub were taken every 30° and are contained in Table A-22. The inhibitor height ranged from 4.5 to 8.5 inches. Although the erosion was uneven, the remaining inhibitor stub heights for this segment were within the expected

tolerance band for past flight motors based on a statistical analysis of the historical database (Reference 5). There were no inhibitor tears greater than 3 inches in length noted on this inhibitor.

The segment had no liner remaining. This condition is common for an aft segment.

The erosion in the aft dome was similar to past flight motors. NBR under the CF/EPDM was exposed intermittently in the area roughly 20 inches forward of the nozzle boss. This is a common condition in the aft dome. Four to six small blisters were identified in the CF/EPDM in the aft dome. The largest blister was near 300° and measured 1.75 inches axially by 0.25 inches circumferentially. All blisters were in an area approximately 13 inches forward of the nozzle boss. The size and frequency of the blisters were significantly less than was seen on the previous flight set and are considered a normal condition.

The aft segment acreage insulation was in normal condition. There were no gouges, separations, cuts, missing material, excessive erosion, or other areas of blisters.

6.5.2 RSRM-7A Aft Center Segment Acreage Insulation

The condition of the aft center segment internal insulation is recorded in Tables A-24 through A-27.

The forward facing NBR inhibitor stub exhibited uniform erosion full circumference. Measurements of the remaining NBR inhibitor stub were taken every 30° and are contained in Table A-25. The inhibitor stub heights ranged from 11.5 to 14.5 inches for this segment, which is within the expected tolerance band. There were no inhibitor tears greater than 3 inches in length noted on this segment. Three areas of missing material were noted on the heat affected edge of the inhibitor between 45° and 90°. These appeared to be the result of splashdown debris.

Liner coverage in the aft center segment was heavy near the clevis end and generally missing aft of the factory joint. The diagram of the liner pattern is shown in Figure 3.

The condition of the flap region is recorded in Table A-27. The castable inhibitor was completely missing full circumference, and the stress relief flap was eroded back to the flap bulb full circumference.

Both of these conditions are typical of an aft center segment. The CF/EPDM under the flap was eroded away full circumference. The exposed NBR under the flap appeared to be heat affected.

No evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified in the aft center segment.

6.5.3 RSRM-7A Forward Center Segment Acreage Insulation

The condition of the forward center segment internal insulation is recorded in Tables A-28 through A-31.

The forward facing NBR inhibitor stub exhibited uniform erosion full circumference. Measurements of the remaining NBR inhibitor stub were taken every 30° and are contained in Table A-29. The inhibitor stub heights for this segment ranged from 23.75 to 27.5 inches for this segment, which is within the expected tolerance band.

Nine radial tears greater than 3 inches long were noted. The longest tear was 11.75 inches and extended radially outward to approximately 12.5 inches inboard of the clevis I.D. surface. The edges of the tears demonstrated no material loss or erosion. This indicated that the tears occurred after motor burn. The location and length of the tears are contained in Table A-30. The tears are believed to be a result of re-entry or splashdown loads.

Liner coverage for the forward center segment was heavy near the clevis end and mostly missing aft of the factory joint. The diagram of the liner pattern is shown in Figure 4.

The castable inhibitor was completely missing full circumference, which is typical of a forward center segment. The end of the stress relief flap measured from 6.5 to 11.5 inches forward of the tip of the tang. Axial measurements were taken every 90° and are shown in Table A-31. There were no flap tears. The CF/EPDM under the flap was present but slightly eroded and heat affected full circumference. A number of small blisters (approximately 0.25 by 0.50 inch) were noted in the CF/EPDM between 54° and 80°. These were noted between 4 and 9 inches forward of the tip of the tang. Only one of the blisters was opened. The condition appeared to be the result of normal heat effects.

No other evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified in the forward center segment.

6.5.4 RSRM-7A Forward Segment Acreage Insulation

The condition of the forward segment internal insulation is recorded in Tables A-32 and A-33.

The eleven point star pattern in the liner was easily distinguishable, and the star and non-star liner termination points were comparable to past flight motors, as shown in Figure 5. The liner remaining under the star tip regions was present from the tip of the tang forward to 142.0 inches. The liner remaining under the non-star tip was present from the tip of the tang forward to 148.5 inches. The liner was light between the tip of the tang and the flap bulb.

The castable inhibitor was completely missing full circumference. The end of the stress relief flap measured from 3.5 (full flap remaining) to 7.0 inches forward of the tip of the tang. Axial measurements were taken every 90° and are shown in Table A-33. The flap was scalloped and curled back. The NBR under the flap was heat affected full circumference as has been seen on all previous RSRM forward segments.

A detailed examination was performed on the insulation in the forward dome near the igniter boss to inspect for excessive erosion, insulation voids, and thin insulation. No gas paths or areas of abnormal erosion were identified. The insulation in this area was removed and evaluated further. No indications of folds or voids at the insulation to case interface were noted. Dissection and evaluation of the RSRM-7A igniter boss forward dome samples were completed and thickness measurements, void mapping, and photographs of the samples were done. Inspection showed there were a few small voids (typically 0.10 inch with 0.17 inch maximum diameter) and one small fold at the case surface. The average remaining insulation thickness (postfire) in the 5 inch to 7.5 inch distance from the igniter boss was 0.394 inch. The minimum remaining insulation thickness was 0.299 inch.

No evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified in the forward segment.

Table A-34 contains a list of all photographs taken of the RSRM-7A insulation.

6.6 POSTFIRE EVALUATION OF RSRM-7A PREFIRE DISCREPANCIES

The prefire discrepancy reports for the RSRM-7A insulation were evaluated prior to launch to identify significant items. These are identified in References 3 and 4, and the postfire conditions are discussed below.

DR 157901-01 documented cuts, depressions, and missing material on the aft segment nozzle boss insulation bonding surface at 63°, 153°, 167°, 232°, 270°, and 330°. The condition was the result of a prefire nozzle removal operation. Postfire evaluation of this condition indicated that the surface irregularities had no effect on the function of the nozzle to case joint. The conditions in the bonding area were filled with polysulfide adhesive at joint assembly.

DR 169339-01 documented a depression intermittently around the entire circumference of the nozzle to case joint flap of the aft segment. This area was eroded away during normal motor operation, and no adverse effects were noted.

Cracks existed in the aft segment J-joint clevis insulation radius region at 82°, 95° (0.04 inch deep), 154° through 156°, and 238°. These were documented on PR PV6-136315 and PV6-136320. The cracks were evaluated, and no effects on the function of the joint were noted.

Missing material was noted on the tip of the aft center segment J-leg at 158°, 160°, and 166° as noted on DR 169323-01. This area was eroded away during normal motor operation, and no adverse effects were noted.

Missing material was noted aft of the capture feature O-ring groove (region E, Reference 6) of the aft center segment tang end from 145° to 152° and from 155° to 158° as noted on DR 169331-01. This condition was inspected during the postfire evaluation, and no effects on the function of the joint were noted.

Contamination was noted on the insulation surface of the aft center segment 50 inches forward of the tang at 90°. The contamination was 1.1 inches longitudinally by 3.6 inches circumferentially and was cleaned off prior to continuing the manufacturing process. The discrepancy was documented on DR 169331-02. This location was inspected during the postfire evaluation, and no evidence of the condition remained.

A crack was noted in the aft center segment J-joint clevis insulation radius region at 158° measuring 0.09 inch deep by 0.075 inch in length. The condition was documented on PR PV6-134026. The area of the crack was inspected during the postfire evaluation, and the crack could not be located.

Missing material was noted on the molded tang surface of the forward segment in region E (Reference 6) at 251°. This condition was documented on DR 169545-01. This condition was inspected during the postfire evaluation, and no effects on the function of the joint were noted.

Voids were noted in the insulation in the forward segment igniter boss region as noted on DR 171514-01. The insulation in this region was removed for further evaluation. No indications of voids were found at the insulation to case surface.

Dissection and evaluation the RSRM-7A igniter boss forward dome samples were completed. Thickness measurements, void mapping, and photographs of the samples were done as discussed in Section 6.5.4.

7.0 RSRM-7A INSULATION PERFORMANCE EVALUATION

The RSRM-7A segments were insulated to meet the RSRM design drawing requirements. The internal insulation was designed to meet a 2.0 material decomposition safety factor in the nozzle to case joint, case field joint, and factory joint areas, and a 1.5 material decomposition safety factor for the acreage insulation for all segments. All safety factor analyses discussed in this report will deal with the above mentioned material decomposition safety factors.

The insulation was designed using $M + 3\sigma$ material decomposition depths established from the HPM database. References 7 and 8 explain the database analysis and the design methodology, respectively.

The nozzle to case joint, field joints, factory joints, and case wall insulation were evaluated based on the actual safety factor and compliance safety factor as required by the CEI specification. This evaluation was done by the use of prefire and postfire measurements.

Prefire insulation thickness measurements were taken in the aft dome up to the 24.3 inch station by means of a template that was bolted to the nozzle boss. A depth gage was used to measure the distance from the template to the bare metal dome before insulation layup. The measurement was repeated after insulation cure to determine the distance from the template to the insulation surface. The two measurements were then subtracted to determine the prefire insulation thickness. This measurement process was performed a third time after firing and char removal to determine the postfire thickness and material decomposition depth.

Prefire thicknesses at all other locations within the motor were measured using ultrasonic inspection methods.

Postfire insulation thicknesses were determined in the aft segment (forward of the 24.3 inch station), the center segments, and the forward segment by drilling holes in the insulation to the case wall and measuring the insulation thickness with a depth gage.

For the purpose of this report, the nozzle to case joint and the field joints will be dealt with in separate sections. All other areas, including the case acreage, the factory joints, and any other regions requiring a minimum 2.0 safety factor, will be dealt with in the sections devoted to the specific motor segments.

Several axial performance stations previously measured on HPM motors have been moved or eliminated to avoid ply terminations, tapered areas, and other conditions created by the RSRM design. Other locations have been added to provide a more complete database.

Some segment stations had liner material remaining after firing. For analysis purposes, the prefire measurements were used in place of the postfire measurements where liner was remaining, and the MDD was considered to be zero.

Several terms used in this part of the report are defined as follows:

Safety Factor (ASF): The material decomposition safety factor based on the actual prefire thickness and actual MDD.
ASF = prefire thickness / MDD.

Aft Cylinder: That region of the aft segment forward of 55.0 inches from the nozzle boss.

Aft Dome: That region of the aft segment from the aft face of the nozzle boss to and including 55.0 inches forward of the nozzle boss.

Compliance Safety Factor (CSF): The material decomposition safety factor based on the MDT and actual MDD. CSF = MDT / MDD.

Exposure Time (E.T.): That amount of time that a particular station is subjected to the internal motor environment. The time is measured in seconds and determined by ballistic evaluation (Reference 9).

HPM Database: That set of data derived from static and flight HPM motors and defined in Reference 7.

HPM Database Maximum MDD: The largest single MDD computed for a given axial station in the HPM database.

M + 3σ MDD: The analytically derived MDD values from the HPM database used as the insulation design basis where:
M = the median of the 'within motor' MDD medians
σ = the root sum square of the 'motor to motor' MDD standard deviation (σ_M) and the median of the 'within motor' standard deviations (σ_{MED}) Reference 7.

$$\sigma = (\sigma_M^2 + \sigma_{MED}^2)^{1/2}$$

Material Decomposition Depth (MDD): The amount of material that is decomposed during firing due to erosion or heat effects measured in inches. MDD = prefire thickness - postfire thickness.

Material Decomposition Rate (MDR): The average rate at which material is decomposed as a result of erosion or heat effect. The value is measured in mils (thousandths of an inch) per second and assumes a constant decomposition rate throughout the exposure time. MDR = 1000 X MDD / E.T.

Minimum Design Thickness (MDT): The minimum insulation thickness defined on the 1U design drawings. The thicknesses are designed to meet the appropriate safety factor based on an M + 3σ material decomposition and the HPM design thickness (Reference 8).

Performance Station: An axial location in the segment found by measuring forward from the tang tip (on the forward and center segments) or from the nozzle boss face (on the aft segment). The stations in the forward dome are located by continuing the measurement along the insulation surface contour from the 321.0 inch station. Figure 6 shows the location of the stations within each segment.

7.1 RSRM-7A NOZZLE TO CASE JOINT

The 2.0 safety factor region of the nozzle to case joint area is defined as that area 2 inches to either side of the joint insulation interface, measured along the insulation internal surface contour. Safety factors were evaluated by examining the MDDs at two locations: 1) at the base of the joint stress relief flap gap and 2) on the aft dome insulation at the joint interface.

Visual inspection of the flap gap has revealed that no significant heating occurs in this region. In fact, the Teflon tape which is in the gap is visible after firing. For this reason, no further measurements or inspections in the flap gap were necessary.

The MDD at the nozzle to case joint insulation interface was calculated at 16 planes using the prefire and postfire insulation thickness as measured per Figure 7. The MDT used in the CSF calculations at the nozzle to case joint was 4.900 inches based on the MDT at the 7.8 and 9.3 inch stations.

The safety factors for the RSRM-7A nozzle to case joint are shown in Table 7. The minimum CSF for the nozzle to case joint was 4.6 at the 0° plane. The minimum ASF was 5.2 at the 0° plane. The median MDD for the nozzle to case joint was 0.703 inch and ranged from 0.479 to 1.067 inch. The safety factors for the nozzle to case joint exceeded the 2.0 requirement in all areas.

7.2 RSRM-7A FIELD JOINTS

The 2.0 safety factor region of the field joint area is defined as that area 2 inches to either side of the joint insulation interface. The joint safety factors were evaluated by examining the MDDs in three areas: 1) in the pressurization gap, 2) at the 3.5 inch station, and 3) at the joint insulation interface.

From a visual inspection of all field joints, it was apparent that no significant material decomposition had occurred in the area of the pressurization gap terminus. For this reason, no further measurements or inspections in the pressurization gaps were necessary.

The safety factor at the 3.5 inch station for each field joint will be dealt with in the discussion of the respective segments.

The safety factors at the joint insulation interface were calculated using the MDD on the clevis joint insulation. The MDD was calculated at 24 planes using the prefire and postfire thicknesses as measured per Figure 8. The MDT used in the CSF calculations was 2.595 inches. This minimum is derived by subtracting the maximum 1U inner clevis leg metal thickness of 0.430 inch from the minimum 1U drawing insulation and case thickness of 3.025 inches.

The clevis side of the joint interface sits approximately 0.150 inch radially inboard of the J-leg tip when the joint is assembled. As a result, the clevis side is exposed to a more severe environment and experiences more material decomposition than the J-leg tip. This tends to inflate the MDD value at the joint. A more realistic approach to calculating the joint safety factors would be to use the tang J-leg insulation. It is not possible, however, to obtain corresponding prefire and postfire measurements because the J-leg does not return to the same position after the joint has been assembled and disassembled. For this reason, the clevis side insulation is used to calculate the joint CSF and ASF and is considered to be quite conservative.

7.2.1 RSRM-7A Aft Field Joint

The safety factors for the RSRM-7A aft field joint insulation interface are shown in Table 8.

The minimum CSF for the joint interface was 5.4 at the 210° plane. The minimum ASF was 5.8, also at the 210° plane. The median MDD for the aft field joint was 0.411 inch and ranged from 0.314 to 0.477 inch. The safety factors for the aft field joint exceeded the 2.0 requirement in all areas.

7.2.2 RSRM-7A Center Field Joint

The safety factors for the RSRM-7A center field joint insulation interface are shown in Table 9.

The minimum CSF for the joint interface was 9.6 at the 90° plane. The minimum ASF was 10.5 at the 90° plane. The median MDD for the center field joint was 0.163 inch and ranged from 0.119 to 0.269 inch. The safety factors for the center field joint exceeded the 2.0 requirement in all areas.

7.2.3 RSRM-7A Forward Field Joint

The safety factors for the RSRM-7A forward field joint insulation interface are shown in Table 10. The minimum CSF for the interface was 12.7 at the 166° and 180° planes. The minimum ASF was 13.4, at the 180° plane. The median MDD for the forward field joint was 0.165 inch and ranged from 0.078 to 0.204 inch. The safety factors for the forward field joint exceeded the 2.0 safety factor requirement in all areas.

7.3 RSRM-7A AFT SEGMENT

For purpose of this analysis, the aft segment is divided into the aft dome region and the aft cylinder region. The aft segment was measured in eight degree planes forward of the 98.0 inch station and at sixteen degree planes at and aft of the 98.0 inch station.

7.3.1 RSRM-7A Aft Dome

The safety factor analysis and the supporting measurement data for the RSRM-7A aft dome are shown in Table 11. All safety factors for the aft dome were acceptable. The minimum CSF was 1.92 at the 18.5 and 19.5 inch stations in the 111.6° plane. The minimum ASF was 2.27 at the 18.5 and 19.5 inch stations in the 111.6° plane.

Figure 9 shows how the RSRM-7A aft dome MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was exceeded at the following aft dome station:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7A MED MDD	RSRM-7A MAX MDD	M + 3 σ DES MDD	MIN CSF
17.3	1 of 16	1.027	1.564	1.409	1.802	1.675	1.98
18.5	4 of 16	0.986	1.419	1.331	1.749	1.496	1.92
19.5	1 of 16	0.978	1.352	1.174	1.644	1.617	1.92

The postfire measurement at these locations were retaken and verified. The prefire and postfire measurements at these stations were analyzed, and no apparent problems with the data could be seen. Although the noted maximum MDD at this station exceeded the M + 3σ MDD used to design the insulation, the minimum CSF is above the required 1.5 value. This station will be closely monitored in future motors to determine if the measurements indicate a trend.

7.3.2 RSRM-7A Aft Cylinder

The safety factor analysis and the supporting measurement data for the RSRM-7A aft cylinder are shown in Table 12. All safety factors for the aft cylinder were acceptable. The minimum CSF was 2.22 at the 145.5 inch station in the 316.8° plane. The minimum ASF was 2.19 at the 145.5 inch station in the 316.8° plane.

The 56.0, 177.7, and 299.1 inch stations are located in regions which require a 2.0 safety factor. The minimum CSFs at these stations were 3.33, 2.54, and 2.99, respectively. The minimum ASFs were 4.12, 3.82, and 4.54, respectively.

Figure 10 shows how the RSRM-7A aft cylinder MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs. The M + 3σ design MDD was not exceeded at any station.

Station 56.0 at the 158.4 degree plane had a very high postfire measurement that resulted in a 0 MDD. This is believed to be due to a measurement error.

7.4 RSRM-7A AFT CENTER SEGMENT

The aft center segment was measured at eight degree planes. The safety factor analysis and the supporting measurement data for the RSRM-7A aft center segment are shown in Table 13. All safety factors for the aft center segment were acceptable. The minimum CSF was 2.43 at the 71.5 inch station in the 316° plane, and the minimum ASF was 2.60 at the 30.7 inch station in the 316° plane.

The 3.5 and 161.4 inch stations are located in regions which require a 2.0 safety factor. The minimum CSFs were 3.48 and 3.58, respectively. The minimum ASFs were 4.41 and 9.70, respectively.

Figure 11 shows how the RSRM-7A aft center segment MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was not exceeded at any station.

One plane at the 39.7 inch station and one plane at the 71.5 had a postfire measurement that was higher than the surrounding postfire data. All prefire data at these stations was comparable. These resulted in a 0 MDD. This could indicate the prefire measurements and the postfire measurements were taken in different locations or that data was improperly measured or recorded.

7.5 RSRM-7A FORWARD CENTER SEGMENT

The forward center segment was measured at eight degree planes. The safety factor analysis and the supporting measurement data for the RSRM-7A forward center segment are shown in Table 14. All safety factors for the forward center segment were acceptable. The minimum CSF was 2.81 at the 39.7 inch station in the 316° plane, and the minimum ASF was 4.38 at the 214.1 inch station in the 270° plane.

The 3.5 and the 161.4 inch stations are located in regions which require a 2.0 safety factor. The minimum CSFs were 10.34 and 3.15, respectively. The minimum ASFs were 12.60 and 7.83, respectively.

Figure 12 shows how the RSRM-7A forward center segment MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was exceeded at the following forward center segment station:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7A MED MDD	RSRM-7A MAX MDD	M + 3 σ DES MDD	MIN CSF
214	1 of 16	0	0.026	0	0.032	0.029	4.06

The postfire measurements at this location was retaken and verified. No unusual conditions were noted in either the prefire or postfire data. Although the noted maximum MDD at this station exceeded the M + 3σ used to design the insulation, the minimum CSF is well above the required 1.5 value.

7.6 RSRM-7A FORWARD SEGMENT

The forward segment performance data was separated into two groups: the star tip and non-star tip planes. The star tip planes are defined as the 90°, 154°, 222°, 286°, and 352° planes which lie under the thin portion of the propellant grain. These planes have a higher exposure time than the non-star tip planes. The non-star tip planes are defined as the 74°, 140°, 206°, 270°, and 336° planes. These planes lie under the thick parts of the forward segment propellant grain.

7.6.1 RSRM-7A Forward Segment Star Tip Planes

The safety factor analysis and the supporting measurement data for the RSRM-7A forward segment star tip planes are shown in Table 15. All safety factors for the forward segment star tip planes were acceptable. The minimum CSF was 1.71 at the 280.0 inch station in the 222° plane, and the minimum ASF was 2.14 also at the 280.0 inch station in the 222° plane.

The 3.5, 162.0, and 321.0 inch stations are located in areas which require a 2.0 safety factor. The minimum CSFs at these stations were 13.01, 3.06, and 3.15, respectively. The minimum ASFs for these stations were 16.21, 4.40, and 3.43, respectively.

Figure 13 shows how the RSRM-7A forward segment star tip MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was exceeded at the following forward segment star tip station:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7A MED MDD	RSRM-7A MAX MDD	M + 3 σ DES MDD	MIN CSF
3.5	4 of 5	0*	0*	0.141	0.163	0.103	13.01

* Data taken from closest adjacent station.

The MDD at the 3.5 inch station was higher than that experienced in the HPM motors. This condition, however, has been noted on all previous RSRMs and is not unexpected. Even with the increased MDD values, the minimum CSF noted at this station was 13.01. This condition will continue to be monitored on future motors.

7.6.2 RSRM-7A Forward Segment Non-Star Tip Planes

The safety factor analysis and the supporting measurement data for the RSRM-7A forward segment non-star tip planes are shown in Table 16. All safety factors for the forward segment non-star area were acceptable. The minimum CSF was 2.05 at the 305.0 inch station in the 206° plane, and the minimum ASF was 2.45 at the 383.0 inch station in the 206° plane.

The 3.5, 162.0, and 321.0 inch stations are in areas which require a 2.0 safety factor. The minimum CSFs at these stations were 9.72, 5.58, and 6.75, respectively. The minimum ASFs were 12.09, 7.59, and 7.29, respectively.

Figure 14 shows how the RSRM-7A forward segment non-star tip MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was exceeded at the following forward segment non-star tip station:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7A MED MDD	RSRM-7A MAX MDD	M + 3 σ DES MDD	MIN CSF
3.5	4 of 5	0*	0*	0.129	0.218	0.103	9.72

* Data taken from closest adjacent station.

As in the star tip, the MDD at the 3.5 inch station was higher than that experienced in the HPM motors. This condition, however, has been noted on all previous RSRMs and is not unexpected. Even with the increased MDD values, the minimum CSF noted at this station was 9.72. This condition will continue to be monitored on future motors.

One plane at the 321.0 inch station had a postfire measurement that was higher than the surrounding postfire data with comparable prefire data. This resulted in a 0 MDD. This could indicate the prefire measurements and the postfire measurements were taken in different locations or that the data was improperly measured or recorded.

8.0 RSRM-7B VISUAL EVALUATIONS

The condition of the RSRM-7B insulation components is discussed in the following subsections. A copy of the inspection documentation can be found in Appendix B.

8.1 RSRM-7B EXTERNAL INSULATION

8.1.1 RSRM-7B Factory Joint Weatherseals

The condition of the factory joint weatherseals is recorded in Tables B-1 through B-7. No water was noted under any of the RSRM-7B weatherseals as was evident by the lack of any corrosion when the weatherseals were removed. No significant areas of missing EPDM insulation were noted on any factory joint weatherseal. One debris hit area was noted on the aft edge of the forward center segment weatherseal. The missing material was located near 270° and measured approximately 2 inches circumferentially by 1 inch longitudinally. The debris was most likely from nozzle severance.

The weatherseals on all three aft segment factory joints were slightly heat affected generally from 220°-270°-320° due to the plume radiation from the solid rockets motor and shuttle main engines. The heaviest heat effects occurred near 270°. This is a normal occurrence that had no effect on the performance of the weatherseals.

Two insulation to case unbonds were identified on the forward edge of the RSRM-7B forward segment cylinder to cylinder weatherseal. The weatherseal was unbonded centered at 160° for 14 inches to a depth

ranging from 1.0 to 1.5 inches. The paint was also peeled and missing in two areas forward of the weatherseal. The occurrences measured 2.4 inches longitudinally by 5 inches circumferentially and 3.25 inches longitudinally by 7 inches circumferentially. The forward edge of the weatherseal was also unbonded centered at 135° for 11 inches to a depth of 0.1 inch. An aft edge unbond was noted at 210° and measured 0.6 inch longitudinally by approximately 1 inch circumferentially. All unbonds were at the Chemlok 205 to case interface.

Research of the manufacturing logs for the RSRM-7 factory joint weatherseals revealed that the Conscan readings for the RSRM-7B forward segment cylinder to cylinder weatherseal were above current planning requirements. The results of the swab sample taken in the unbond at KSC revealed no measurable contamination.

As was discussed on the RSRM-7A motor, a team has been established to evaluate the occurrence of weatherseal unbonds.

The remainder of the RSRM-7B weatherseals were in excellent condition.

8.1.2 RSRM-7B Stiffener Stub and Rings

The condition of the insulation over the forward stiffener stub and the stiffener rings is recorded in Tables B-8 through B-11. The insulation was in good condition with normal heat effects and discoloration on all surfaces. The heaviest heat effects occurred from 220°-270°-320° due to the plume radiation from the solid rocket motors and shuttle main engines. No visible damage to any stiffener ring insulation was noted. This was due to the high sea state at the time of booster splashdown. Some insulation unbonds were noted on the end of the ring segments after removal from the case. These unbonds were a result of the hydrolazing process. The K5NA repair on the outboard edge of the forward stiffener stub showed normal erosion and some small missing chunks intermittently around the circumference.

8.2 RSRM-7B NOZZLE TO CASE JOINT

The nozzle to case joint insulation condition is recorded in Table B-12 and B-13. The nozzle to case joint performed as expected with no polysulfide blowholes identified across the bondline. No voids in the polysulfide were identified. Slight polysulfide porosity was evident in the step region full circumference.

The failure mode of the polysulfide bondline at disassembly was approximately 89% cohesive within the polysulfide, 10% adhesive at the NBR to polysulfide interface, and 1% adhesive at the phenolic to polysulfide interface. The high amount of cohesive failure and the thickness of the polysulfide char on the phenolic at the joint entrance resulted in some slight disassembly damage to the joint stress relief flap. The flap appeared to have been folded over backwards upon itself at the baffle non-bonded areas as the nozzle was removed. The flap then returned to its normal position. This was evident by the scrape marks at the forward edge of the flap coinciding with many of the baffle non-bonded locations. It was also evident on the polysulfide forward of the wiper O-ring where the decomposed polysulfide from the tip of the flap was folded over and had made contact leaving a black mark.

The baffle, which had been bonded back in place as a result of a prefire discrepancy, was still securely bonded at the proper locations.

The vent slots showed an average polysulfide fill of 84% with values ranging from 30% to 100% fill. The vent slot fill was the highest percentage seen to date on any motor.

The bondline around the circumference demonstrated erosion similar to that observed on previous RSRM motors. The polysulfide was decomposed further into the joint than the flap erosion. For approximately 0.40 inch aft of the erosion, the polysulfide was partially decomposed and bubbled. Although the material was partially decomposed, no gas flow occurred in the adhesive bondline decomposed region.

The insulation erosion in the joint region was similar to the condition of previous RSRM flight motors. The NBR flap and baffle appeared to be in excellent shape with normal heat effects and erosion.

8.3 RSRM-7B FIELD JOINTS

8.3.1 RSRM-7B Aft Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table B-14.

The general appearance of the pressure sensitive adhesive was noted. Contact and non-contact within the joint was based on the flat appearance and matted texture, or the glossy appearance of the adhesive. The joint appeared to have made contact full circumference at the tip of the J-leg. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 0.96 inch.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified. Wet sooting extending down the bondline was identified intermittently around the circumference ranging from a depth of 0.20 to 0.70 inch outboard of the remaining material. A maximum condition of 0.90 inch was noted between 176° and 182°. Wet sooting is believed to occur during motor re-entry or splashdown when the joint may flex and allow soot into the bondline.

Two areas which appeared similar to wet sooting were noted at 246°-254° and 286°-296°. These areas had smudge marks within the black area. It was later determined that charred material had been deposited on the bondline as the joint was separated, and the water flowed out. Someone had then attempted to wipe off the charred material causing the smudge marks. This area was solvent cleaned after the evaluation to insure that no heat effects were present.

Tape adhesive residue was noted intermittently on the clevis insulation surfaces and had no effect on the joint.

Cracks and crazing were noted on the clevis insulation in the radius region at 0°, 10°-14°, 35°-42°, 52°, 82°-100°, 165°, 224°, and 338°-342°. The cracks had no adverse effect on the performance of the joint.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis edge separations were identified. Tang edge separations were visible on the aft field joint. The tang insulation edge separations were probed

during postflight inspection at Clearfield H-7. The deepest postfire tang edge separation had a depth of 0.25 inch, as compared with no prefire separation. These separations are documented in Tables 5 and 6.

8.3.2 RSRM-7B Center Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table B-15.

The general appearance of the pressure sensitive adhesive was noted. Contact and non-contact within the joint was based on the flat appearance and matted texture, or the glossy appearance of the adhesive. The joint appeared to have made contact full circumference at the tip of the J-leg. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 1.14 inches.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified. Wet sooting into the joint bondline ranged from 0.30 to 0.70 inch outboard from the remaining material. A maximum condition of 1.35 inches was noted from 166°-182°. This area was solvent cleaned after the evaluation, and no heat effects were noted.

Cracks and crazing were noted on the clevis insulation in the radius region intermittently from 30°-180°-250°. The cracks had no adverse effect on the performance of the joint.

Repair adhesive from a prefire clevis insulation separation repair was noted on the insulation 2.1 inches aft of the clevis tip at 260°, 265°, 292°, 295°, 296°, and 298°. The adhesive did not extend into the bonding region of the joint and did not affect the function of the joint. Evaluation of the segment logs indicates that the edge separation repair was performed at Thiokol before shipment to KSC.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis edge separations were identified. Tang edge separations were visible on the center field joint. The tang insulation edge separations were probed during postflight inspection at Clearfield H-7. The deepest postfire

tang edge separation had a depth of 0.05 inch, as compared with a prefire separation of 0.03 inch. These separations are documented in Tables 5 and 6.

8.3.3 RSRM-7B Forward Field Joint

The joint insulation configuration performed as designed. The joint insulation surfaces exhibited normal charring and erosion. Measurements of the tang material char depths and bondline contact are provided in Table B-16.

The general appearance of the pressure sensitive adhesive was noted. The joint appeared to have made contact full circumference at the tip of the J-leg. The contact area appeared flat with a matted texture. The bondline contact was measured at 0°, 90°, 180°, and 270°. The average contact was 1.11 inches.

No evidence of motor chamber gas leakage to the O-rings or past the J-joint insulation was identified. Wet sooting into the joint bondline ranged from 0.30 to 0.50 inch outboard from the remaining material.

Tape adhesive residue was noted intermittently on the clevis insulation surfaces and had no effect on the joint.

Cracks and crazing were noted on the clevis insulation in the radius region intermittently from 300°-0°-220°. Cracks on this segment had previously been noted on a PR. The cracks had no adverse effect on the performance of the joint.

No clevis or tang edge separations were identified at KSC. During inspection at Clearfield H-7, no recordable (over 0.10 inch deep) clevis or tang edge separations were identified on the forward field joint. This is documented in Tables 5 and 6.

8.4 RSRM-7B IGNITER JOINTS AND INSULATION

The condition of the igniter to case joint insulation is recorded in Tables B-17 through B-20. The condition of the igniter boss insulation was excellent. An evaluation of the insulation to case interface revealed no edge separations. There was loose flashing on the igniter

boss to a maximum depth of 0.075 inch intermittently between 200°-270°-20°. This is a fairly typical condition. The boss molded insulation surface was in good condition with normal erosion on the inboard surface.

The overall condition of the putty in the igniter to case joint was good. The color of the putty was a consistent light olive green. The putty exhibited 100% cohesive failure and nominal tack for the full circumference. There were no blowholes present, however, putty was extruded up to the adapter full circumference and onto the aft face of the adapter intermittently around the circumference. A map of the putty condition is shown in Figure 15.

The condition of the putty in the adapter to chamber joint was good. The color of the putty was a consistent light olive green. The putty exhibited 100% cohesive failure and nominal tack for the full circumference. A blowhole through the putty was noted at 340°. The gas path measured 0.53 inch at the aft edge and 0.50 inch at the forward edge. Soot was in the putty from 315° to 350° but did not extend to the gasket. No adverse effects on the performance of the joint resulted from the blowhole.

The igniter internal and external insulation was in normal condition. No areas of blistering or abnormal erosion were present.

8.5 RSRM-7B ACREAGE INSULATION

8.5.1 RSRM-7B Aft Segment Acreage Insulation

The aft segment internal insulation was in excellent condition and is recorded in Tables B-21 through B-23.

The forward facing NBR inhibitor stub exhibited scalloped erosion intermittently around the circumference. These areas had a very short inhibitor stub with intermittent inhibitor pieces taller than adjacent areas. A similar condition has been noted on all previous RSRM flight aft segments. Measurements of the remaining inhibitor stub were taken every 30° and are contained in Table B-22. The inhibitor height ranged from 3.5 to 9.0 inches. Although the erosion was uneven, the remaining inhibitor stub heights for this segment were within the expected

tolerance band for past flight motors based on a statistical analysis of the historical database (Reference 5). There were no inhibitor tears greater than 3 inches in length noted on this inhibitor.

The segment had no liner remaining. This condition is common for an aft segment.

The erosion in the aft dome was similar to past flight motors. NBR under the CF/EPDM was exposed intermittently in the area roughly 15 to 20 inches forward of the nozzle boss. This is a common condition in the aft dome. No blisters were identified in the CF/EPDM in the aft dome. One area, located at 215° and approximately 15 inches forward of the nozzle boss, initially appeared to be a blister. The area was 3.1 inches circumferentially by 2.7 inches long and was triangular in shape. The peeled up area was approximately 0.05 inch thick. The back side of the remaining material did not exhibit the cross-hatched pattern that was seen on blisters. Instead, it had straight line parallel marks about 0.25 inch apart. It is the opinion of Thermal Insulation Design that this condition was a cut caused by splashdown debris.

Scratches and scuff marks from splashdown debris were noted between 0°-45° from the aft dome factory joint to the NBR inhibitor.

The aft segment acreage insulation was in normal condition. There were no other gouges, separations, cuts, missing material, excessive erosion, or areas of blisters.

8.5.2 RSRM-7B Aft Center Segment Acreage Insulation

The aft center segment internal insulation condition is recorded in Tables B-24 through B-27.

The forward facing NBR inhibitor stub exhibited uniform erosion full circumference. Measurements of the remaining NBR inhibitor stub were taken every 30° and are contained in Table B-25. The inhibitor stub heights ranged from 11.0 to 15.0 inches for this segment, which is within the expected tolerance band.

Two radial tears greater than 3 inches long were noted. The longest tear measured 4.5 inches long and extended radially outward to approximately 10.0 inches inboard of the clevis I.D. surface. The edges

of the tears demonstrated no material loss or erosion. This indicated that the tears occurred after motor burn. The location and length of the tears are shown in Table B-26.

Liner coverage in the aft center segment was heavy near the clevis end and generally missing aft of the factory joint. The diagram of the liner pattern is shown in Figure 16.

The condition of the flap region is recorded in Table B-27. The castable inhibitor was completely missing full circumference, and the stress relief flap was eroded back to the flap bulb full circumference. Both of these conditions are typical of an aft center segment. The CF/EPDM under the flap was missing full circumference, and the NBR underneath it was heat affected and slightly eroded.

Scratches and scuff marks from splashdown debris were noted between 0°-30° the full length of the segment. No other evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified.

8.5.3 RSRM-7B Forward Center Segment Acreage Insulation

The condition of forward center segment internal insulation is recorded in Tables B-28 through B-31.

The forward facing NBR inhibitor stub exhibited uniform erosion full circumference. Measurements of the remaining NBR inhibitor were taken every 30° and are contained in Table B-29. The inhibitor stub heights for this segment ranged from 24.0 to 27.5 inches, which is within the expected tolerance band.

Eight radial tears greater than 3 inches long were noted. The longest tear was 11.5 inches and extended radially outward to approximately 13.5 inches inboard of the clevis I.D. surface. The edges of the tears demonstrated no material loss or erosion. This indicated that the tears occurred after motor burn. The location and length of the tears are contained in Table B-30. The tears are believed to be a result of re-entry or splashdown loads. The radial extent and frequency of the tears identified in the inhibitor stubs on all the RSRM-7 segments were within the range of tears noted on past flight motors.

Liner coverage for the forward center segment was heavy near the clevis end and mostly missing aft of the factory joint. Small patches of thin liner were present intermittently on the insulation over the factory joint. The diagram of the liner pattern is shown in Figure 17.

The castable inhibitor was completely missing full circumference which is typical of a forward center segment. The end of the stress relief flap measured from 6.5 to 11.25 inches forward of the tip of the tang. Axial measurements were taken every 90° and are shown in Table B-31. There were no flap tears noted. The CF/EPDM under the flap was present, heat affected, and slightly eroded full circumference. There were a number of small blisters noted intermittently in the CF/EPDM; none were opened. These appeared to be the result of normal heat effects.

Scratches and scuff marks from splashdown debris were noted between 350°-355°-0° the full length of the segment. No other evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified.

8.5.4 RSRM-7B Forward Segment Acreage Insulation

The condition of forward segment internal insulation is recorded in Tables B-32 and B-33.

The eleven point star pattern in the liner was easily distinguishable, and the star and non-star liner termination points were comparable to past flight motors, as shown in Figure 18. The liner remaining under the star tip regions was present from the tip of the tang forward to 145.7 inches. The liner remaining under the non-star tip was present from the tip of the tang forward to 152.0 inches. The liner was light between the tip of the tang and the flap bulb.

The castable inhibitor was completely missing full circumference. The end of the stress relief flap measured from 3.5 (full length remaining) to 11.0 inches forward of the tip of the tang. Axial measurements were taken every 90° and are shown in Table B-33. The NBR under the flap was heat affected as has been seen on all previous RSRM forward segments.

Dissection and evaluation of the RSRM-7B igniter boss forward dome samples were completed. Thickness measurements, void mapping, and

photographs of the samples were done. Inspection Engineering showed there were a few small voids (typically 0.10 inch with 0.17 inch maximum diameter) and also some small folds at the case surface. The average remaining insulation thickness (postfire) in the 5 inch to 7.5 inch distance from the igniter boss was 0.414 inch. The minimum remaining insulation thickness was 0.300 inch.

No evidence of blisters, separations, gouges, cuts, missing material, or excessive erosion was identified.

Table B-34 contains a list of all photographs taken of the RSRM-7B insulation.

8.6 POSTFIRE EVALUATION OF RSRM-7B PREFIRE DISCREPANCIES

The prefire discrepancy reports for the RSRM-7B insulation were evaluated prior to launch to identify significant items. These are identified in References 3 and 4, and the postfire conditions are discussed below.

Cuts, depressions, and missing material were noted on the nozzle boss insulation bonding surface. Also, the baffle to CF/EPDM interface was torn loose and repaired at several locations. The condition was the result of a prefire nozzle removal operation. The discrepancies were documented on DR 155269-01 and -02. Postfire evaluation of this condition indicated that the surface irregularities had no effect on the function of the nozzle to case joint. The conditions in the bonding area were filled with polysulfide adhesive at joint assembly. The repair to the baffle remained intact, and had no effect on the function of the joint.

Cracks existed in the forward center segment J-joint clevis insulation. The worst case was 31 inches circumferentially by 0.075 inch deep as noted on PR PV6-138717. The cracks were evaluated, and no effects on the function of the joint were noted.

A void was noted in the insulation in the igniter boss region. The discrepancy was documented on DR 161280-01. The insulation in this region was removed for further evaluation. No indications of voids were found at the insulation to case surface. Dissection and evaluation of

the RSRM-7B igniter boss forward dome samples was completed. Thickness measurements, void mapping, and photographs of the samples were done as described in Section 8.5.4.

Thin insulation was noted on the igniter boot. The thinnest condition measured 0.085 inch at 315° per DR 164857-01. The igniter boot was completely burned away during normal motor operation, and no abnormal conditions were noted.

9.0 RSRM-7B INSULATION PERFORMANCE EVALUATION

The RSRM-7B segments were insulated to meet the RSRM design drawing requirements. The performance analysis on the RSRM-7B motor was conducted in the same manner as previously explained for the RSRM-7A motor.

9.1 RSRM-7B NOZZLE TO CASE JOINT

The safety factors for the nozzle to case joint are shown in Table 17. The minimum CSF for the nozzle to case joint was 4.0 at the 0° plane. The minimum ASF was 4.5, also at the 0° plane. The median MDD for the nozzle to case joint was 0.802 inch and ranged from 0.359 to 1.234 inch. The safety factors for the nozzle to case joint exceeded the 2.0 requirement in all areas.

9.2 RSRM-7B FIELD JOINTS

9.2.1 RSRM-7B Aft Field Joint

The safety factors for the RSRM-7B aft field joint insulation interface are shown in Table 18. The minimum CSF for the joint interface was 5.1 at the 120° plane. The minimum ASF was 5.4, also at the 120° plane. The median MDD for the aft field joint was 0.444 inch and ranged from 0.394 to 0.513 inch. The safety factors for the aft field joint exceeded the 2.0 requirement in all areas.

9.2.2 RSRM-7B Center Field Joint

The safety factors for the RSRM-7B center field joint insulation interface are shown in Table 19. The minimum CSF for the joint interface was 11.4 at the 136° plane. The minimum ASF was 12.1, also at the 136° plane. The median MDD for the center field joint was 0.191 inch and ranged from 0.136 to 0.227 inch. The safety factors for the center field joint exceeded the 2.0 requirement in all areas.

9.2.3 RSRM-7B Forward Field Joint

The safety factors for the RSRM-7B forward field joint insulation interface are shown in Table 20. The minimum CSF for the interface was 11.6 at the 136° plane. The minimum ASF was 12.4 also at the 136° plane. The median MDD for the forward field joint was 0.137 inch and ranged from 0.111 to 0.223 inch. The safety factors for the forward field joint exceeded the 2.0 safety factor requirement in all areas.

9.3 RSRM-7B AFT SEGMENT

9.3.1 RSRM-7B Aft Dome

The safety factor analysis and the supporting measurement data for the RSRM-7B aft dome are shown in Table 21. All safety factors for the aft dome were acceptable. The minimum CSF was 1.84 at the 17.3 inch station in the 248.4° plane. The minimum ASF was 2.02 at the 16.0 inch station in the 248.4° plane.

Figure 19 shows how the RSRM-7B aft dome MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDDs were exceeded at the following aft dome stations:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7B MED MDD	RSRM-7B MAX MDD	M + 3 σ DES MDD	MIN CSF
16.0	1 of 16	1.191	1.783	1.580	2.023	1.980	1.87
17.3	3 of 16	1.027	1.564	1.553	1.937	1.675	1.84
18.5	6 of 16	0.986	1.419	1.453	1.728	1.496	1.94

The postfire measurements at these locations were retaken and verified. Although the noted maximum MDD at these stations exceeded the M + 3σ used to design the insulation, the minimum CSF is above the required 1.5 value.

9.3.2 RSRM-7B Aft Cylinder

The safety factor analysis and the supporting measurement data for the RSRM-7B aft cylinder are shown in Table 22. All safety factors for the aft cylinder were acceptable. The minimum CSF was 2.04 at the 145.5 inch station in the 316.8° plane. The minimum ASF was also 2.04 at the 145.5 inch station in the 316.8° plane.

The 56.0, 177.7, and 299.1 inch stations are located in regions which require a 2.0 safety factor. The minimum CSFs at these stations were 2.93, 2.34, and 2.85, respectively. The minimum ASFs were 3.66, 3.60, and 4.53, respectively.

Figure 20 shows how the RSRM-7B aft cylinder MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was not exceeded at any aft cylinder station.

9.4 RSRM-7B AFT CENTER SEGMENT

The aft center segment was measured at eight degree planes. The safety factor analysis and the supporting measurement data for the RSRM-7B aft center segment are shown in Table 23. All safety factors for the aft center segment were acceptable. The minimum CSF was 1.99 at the 11.0 inch station in the 180° plane, and the minimum ASF was 2.44 at the 30.7 inch station in the 46° plane.

The 3.5 and 161.4 inch stations are located in a region which requires a 2.0 safety factor. The minimum CSFs were 2.58 and 3.23, respectively. The minimum ASFs were 3.58 and 8.60, respectively.

Figure 21 shows how the RSRM-7B aft center segment MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDDs were exceeded at the following aft center segment stations:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7B MED MDD	RSRM-7B MAX MDD	M + 3 σ DES MDD	MIN CSF
11.0	8 of 8	0.451*	0.763*	0.885	0.956	0.829	1.99
44.6	3 of 8	0.026	0.141	0.089	0.098	0.090	3.67
48.0	3 of 8	0.045*	0.206*	0.082	0.096	0.089	3.00

* Data taken from closest adjacent station.

The prefire and postfire measurements at these stations were analyzed, and no apparent problems with the data could be seen. Evaluation of the RSRM database trend charts indicated that the prefire measurements at these stations for this segment are at the high end of the RSRM database. Although the noted maximum MDDs at these stations exceeded the M + 3σ MDDs used to design the insulation, the minimum CSFs are above the required 1.5 value. These stations will be closely monitored in future motors to determine if the measurements indicate a trend.

9.5 RSRM-7B FORWARD CENTER SEGMENT

The safety factor analysis and the supporting measurement data for the RSRM-7B forward center segment are shown in Table 24. All safety factors for the forward center segment were acceptable. The minimum CSF was 3.32 at the 161.4 inch station in the 0° plane, and the minimum ASF was 4.15, at the 126.0 inch station in the 46° plane.

The 3.5 and 161.4 inch stations are located in regions which require a 2.0 safety factor. The minimum CSFs were 13.86 and 3.32, respectively. The minimum ASFs were 16.46 and 8.85, respectively.

Figure 22 shows how the RSRM-7B forward center segment MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was not exceeded at any forward center segment station.

9.6 RSRM-7B FORWARD SEGMENT

9.6.1 RSRM-7B Forward Segment Star Tip Planes

The safety factor analysis and the supporting measurement data for the RSRM-7B forward segment star tip planes are shown in Table 25. All safety factors for the forward segment star tip area were acceptable.

The minimum CSF was 1.76 at the 394.0 inch station in the 222° plane, and the minimum ASF was 2.31 also at the 394.0 inch station in the 222° plane.

The 3.5, 162.0, and 321.0 inch stations are located in areas which require a 2.0 safety factor. The minimum CSFs at these stations were 22.55, 2.42, and 4.06, respectively. The minimum ASFs for these stations were 26.54, 3.80, and 4.55, respectively.

Figure 23 shows how the RSRM-7B forward segment star tip MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDD was exceeded at the following forward segment star tip station:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7B MED MDD	RSRM-7B MAX MDD	M + 3 σ DES MDD	MIN CSF
13.0	5 of 5	0*	0*	0.172	0.214	0.101	3.04

* Data taken from the closest adjacent station

The MDD at the 13.0 inch station was higher than that experienced in the HPM motors. This condition, however, has been noted on all previous RSRMs and is not unexpected. Even with the increased MDD values, the maximum CSF for station 13.0 was 3.04. This condition will continue to be monitored on future motors.

9.6.2 RSRM-7B Forward Segment Non-Star Tip Planes

The safety factor analysis and the supporting measurement data for the RSRM-7B forward segment non-star tip planes are shown in Table 26. All safety factors for the forward segment non-star tip area were acceptable. The minimum CSF was 1.93 at the 383.0 inch station in the 74° plane, and the minimum ASF was 2.36 also at the 383.0 inch station in the 74° plane.

The 3.5, 162.0, and 321.0 inch stations are in areas which require a 2.0 safety factor. The minimum CSFs at these stations were 18.93, 2.79, and 5.77, respectively. The minimum ASFs were 21.91, 4.53, and 6.26, respectively.

Figure 24 shows how the RSRM-7B forward segment non-star tip MDDs compare with the HPM database median MDDs and the M + 3σ design MDDs.

The M + 3σ design MDDs were exceeded at the following forward segment non-star tip stations:

(All Dimensions in Inches)

STATION	PLANES	HPM MED MDD	HPM MAX MDD	RSRM-7B MED MDD	RSRM-7B MAX MDD	M + 3 σ DES MDD	MIN CSF
3.5	1 of 5	0*	0*	0.070	0.112	0.103	18.93
13.0	4 of 5	0*	0*	0.155	0.250	0.101	2.60

* Data taken from the closest adjacent station

The MDDs at the 3.5 and 13.0 inch stations were higher than that experienced in the HPM motors. This condition, however, has been noted on all previous RSRMs and is not unexpected. Even with the increased MDD values, the maximum CSFs were 18.93 and 2.60, respectively. This condition will continue to be monitored on future motors.

REFERENCES

1. TWR-50050 Vol. I Book 1 Rev. A, 'KSC Postflight Engineering Evaluation Plan (Internal and External Insulation)', L. E. MacCauley, 21 November 1989.

2. TWR-16475 Vol. III Book 2 Rev. C, 'Clearfield Postflight Engineering Evaluation Plan (Case Internal Insulation Component)', S. Olson and S. Manz, 10 June 1989.

3. TWR-50050 Vol. I Addendum A, 'KSC Postflight Engineering Evaluation Plan, Addendum A' (RSRM-7), M. Mueller, 22 November 1989.

4. TWR-16475 Vol. III Addendum F, 'RSRM-7 Unique Postfire Evaluation - Insulation Component', S. Hicken, 15 November 1989.

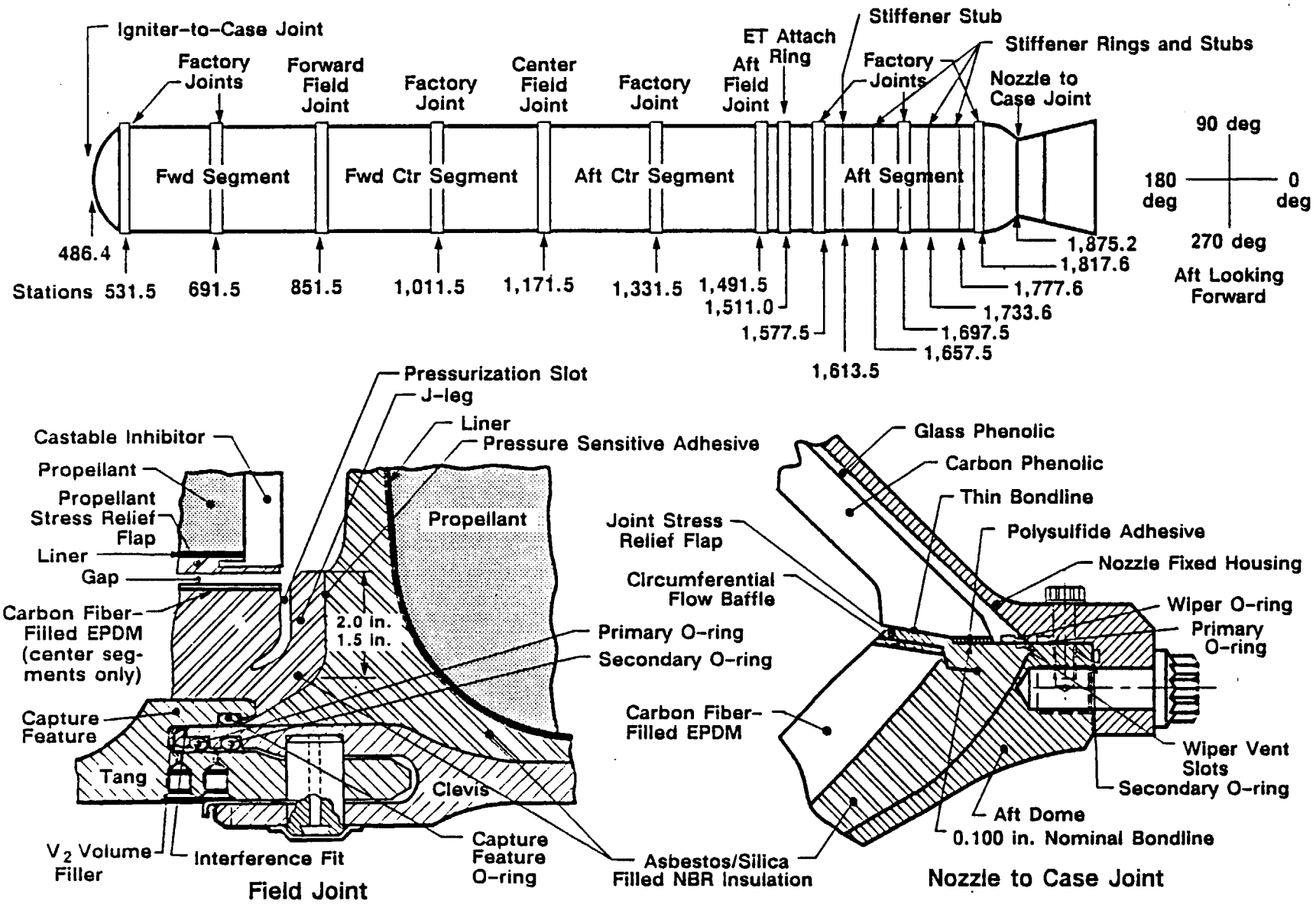
5. Memo L232-FY89-M059, 'Inhibitor Database', B. Cannon, November 1988.

6. STW7-2831 Rev. D, 'Inspection and Process Finalization Criteria, Insulated Components, Space Shuttle Solid Propellant Rocket Motor', N. F. Eddy, 2 November 1989.

7. TWR-16278 Rev. A, 'HPM Internal Insulation Database for the RSRM Design', J. Passman, 5 August 1988.

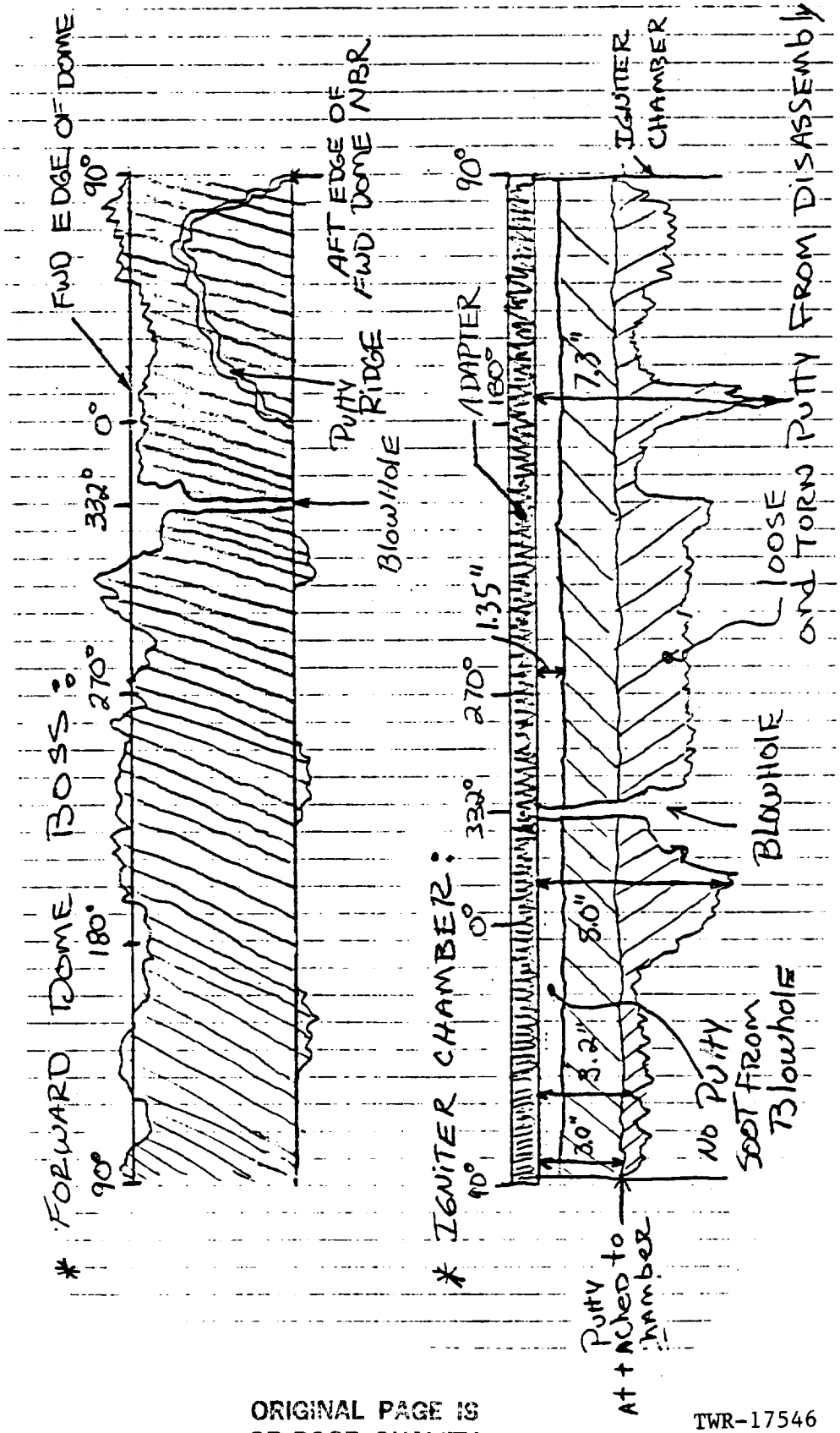
8. TWR-18133 Rev. A, 'RSRM Internal Insulation Design Summary', J. Passman and S. Hicken, September 1988.

9. Interoffice Memo, L632-FY90-M057, 'RSRM Insulation Exposure Times', B. Laubacher, 18 April 1990.



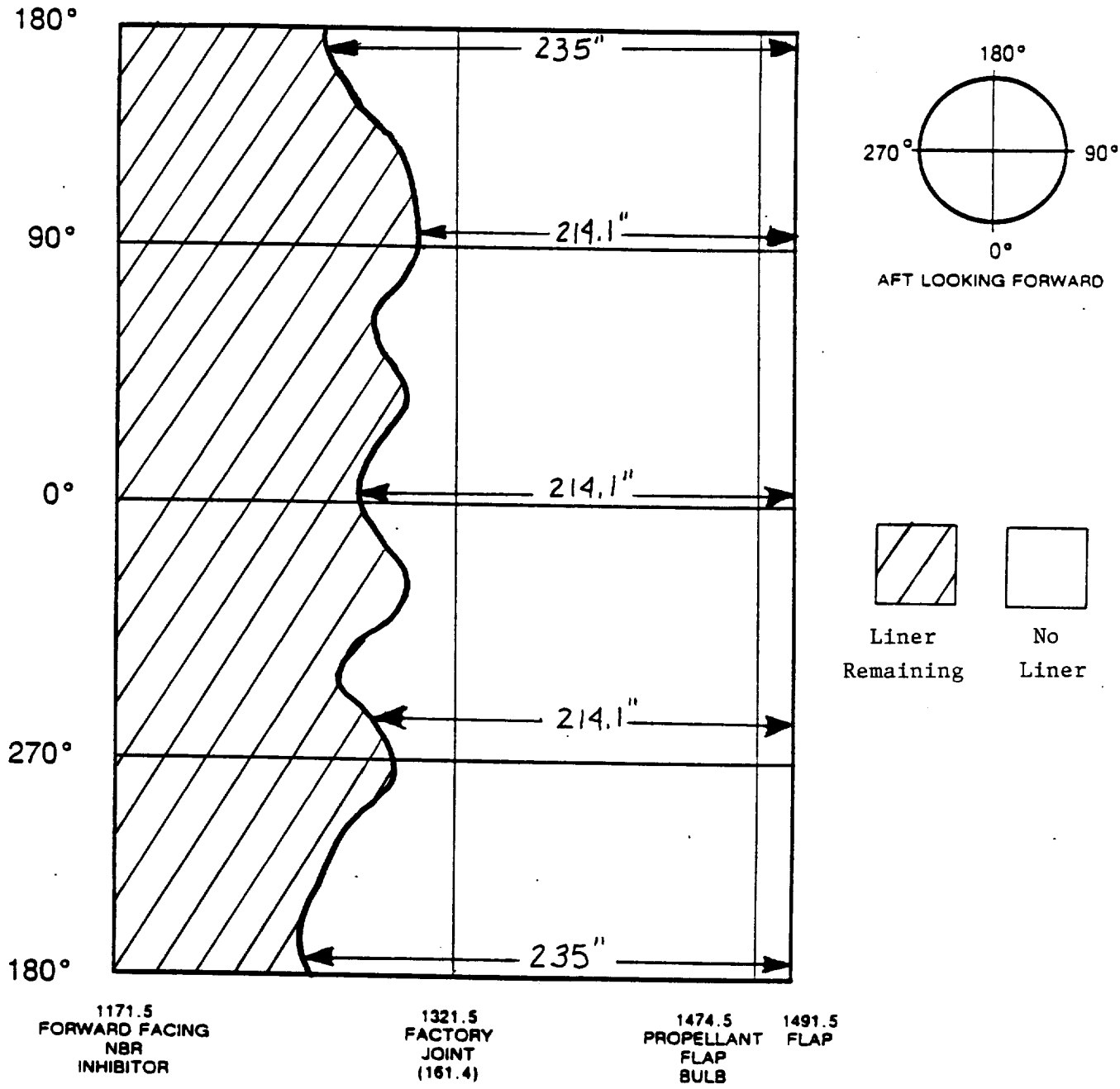
RSRM Motor Configuration

Figure 1



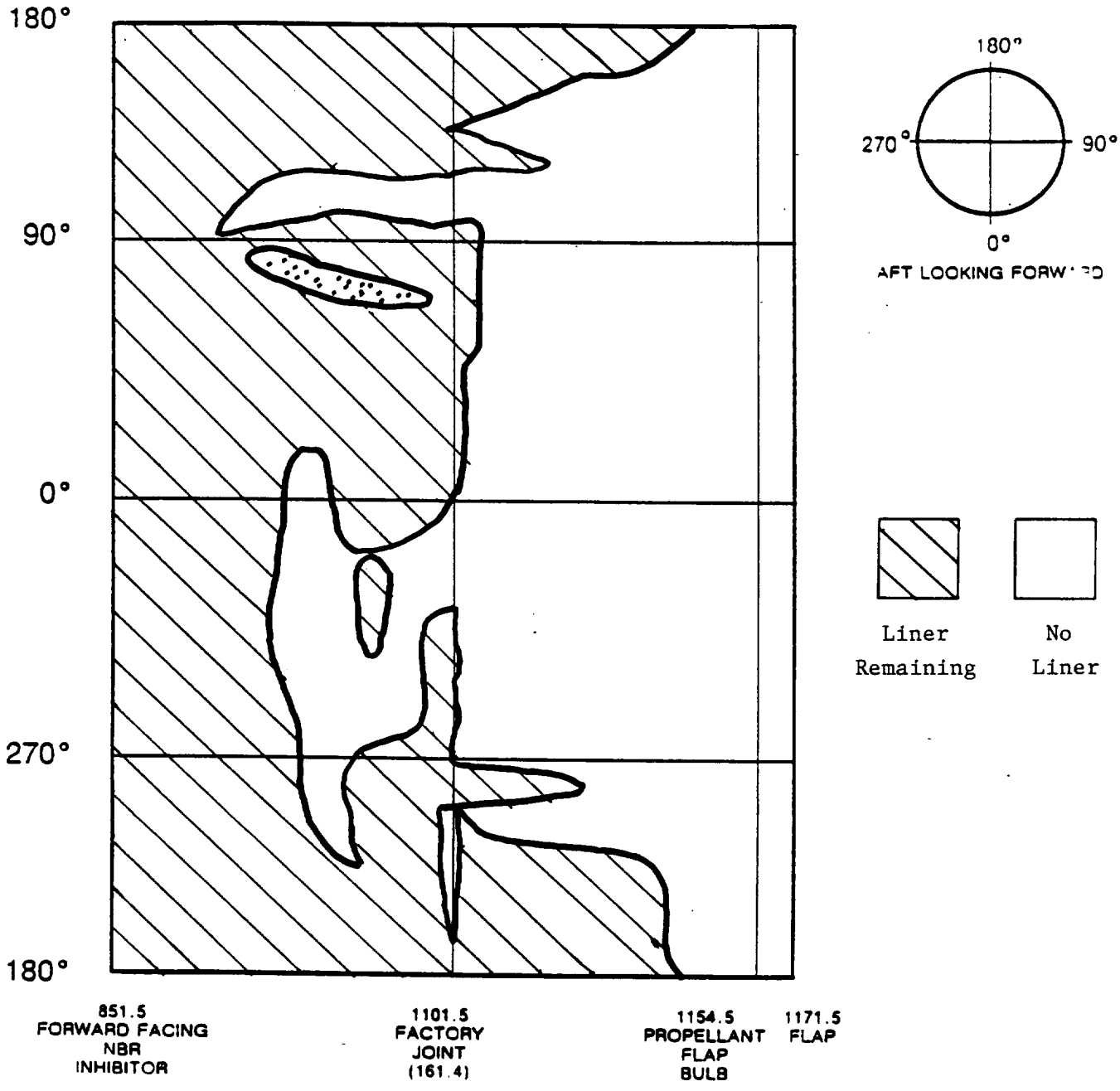
RSRM-7A Igniter to Case Joint Putty Configuration

Figure 2



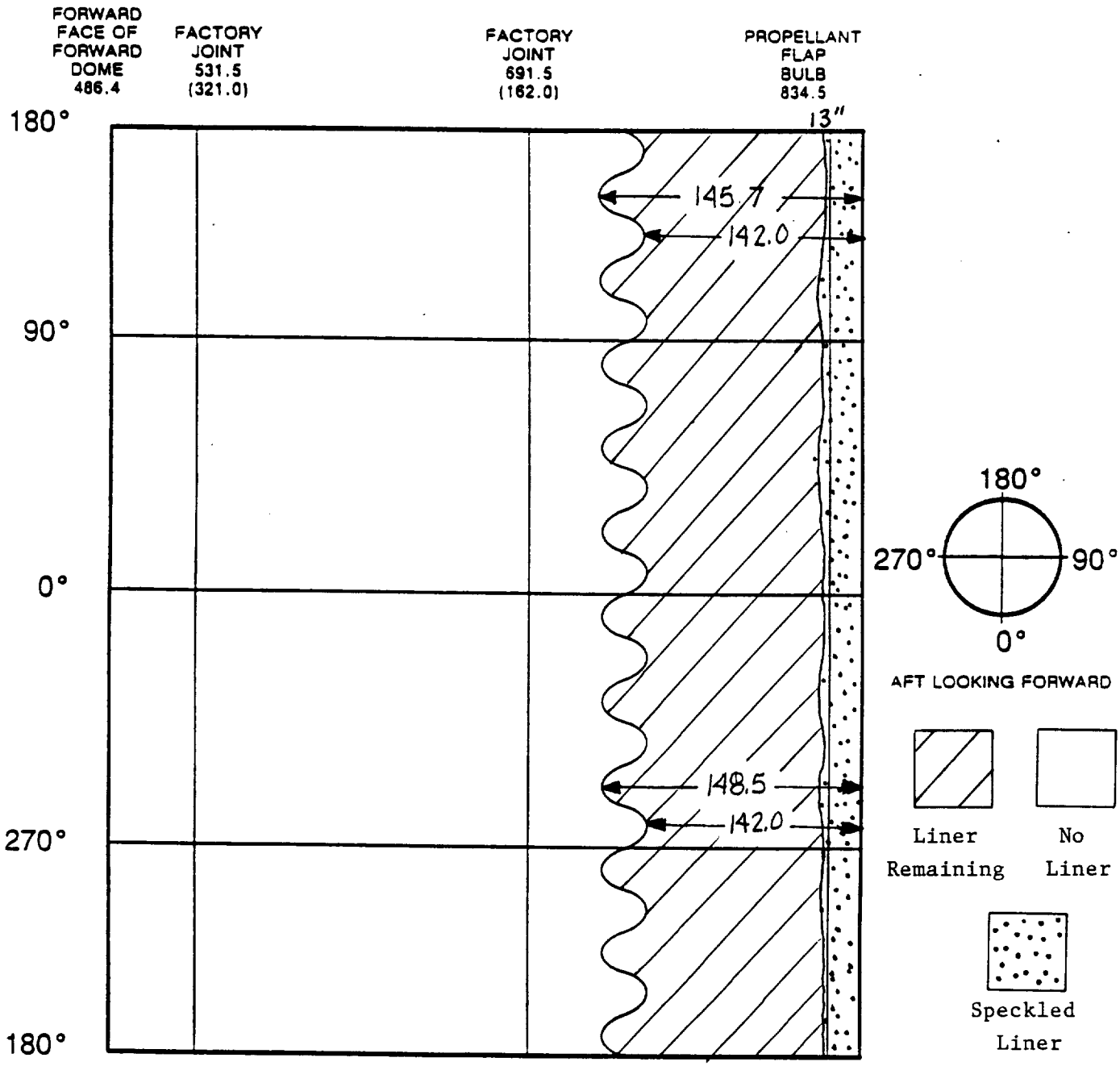
RSRM-7A Aft Center Segment Liner Pattern

Figure 3



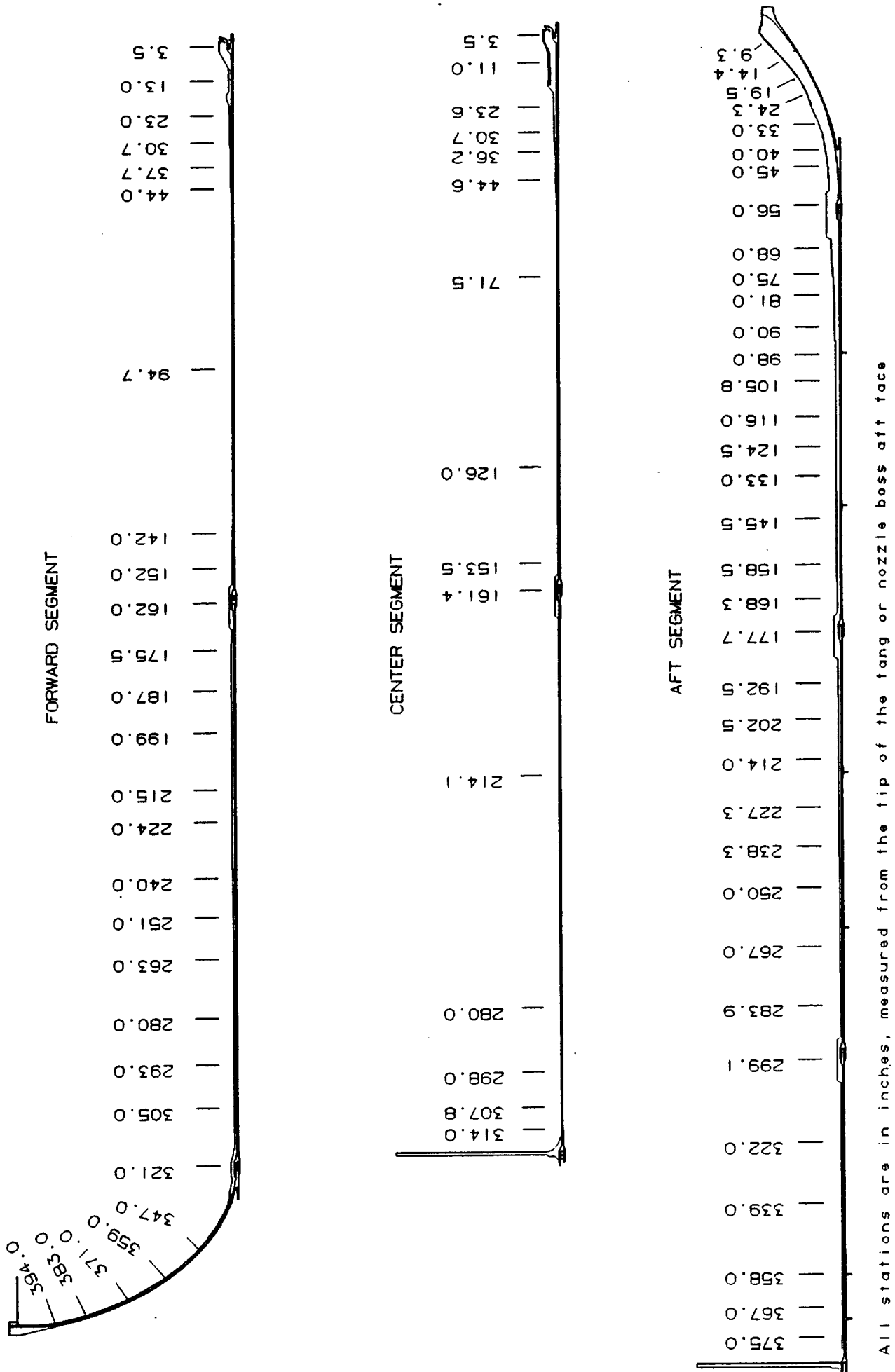
RSRM-7A Forward Center Segment Liner Pattern

Figure 4



RSRM-7A Forward Segment Liner Pattern

Figure 5



RSRM Insulation Performance Stations
Figure 6

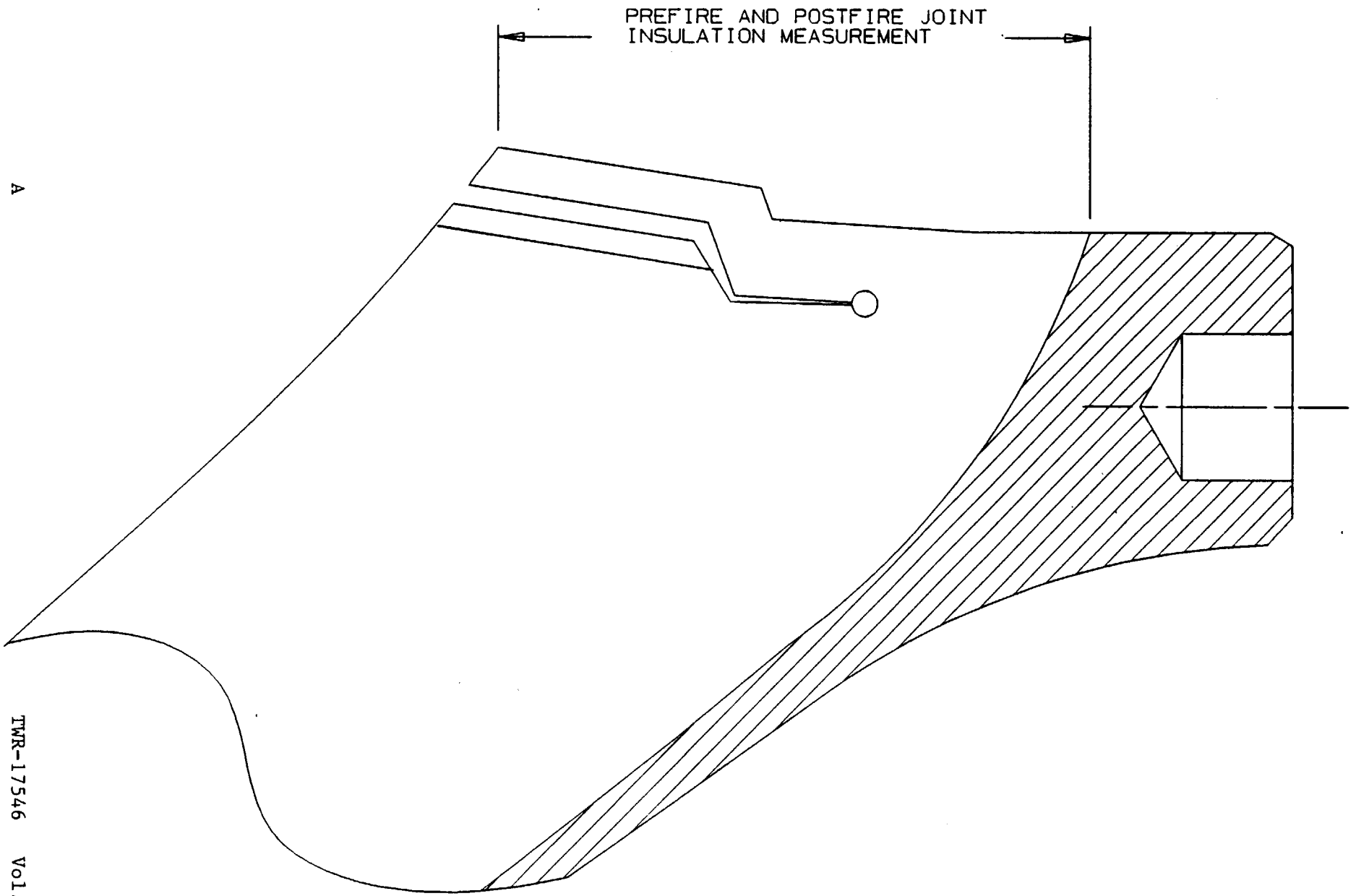


Figure 7

Nozzle to Case Joint Safety Factor Measurement

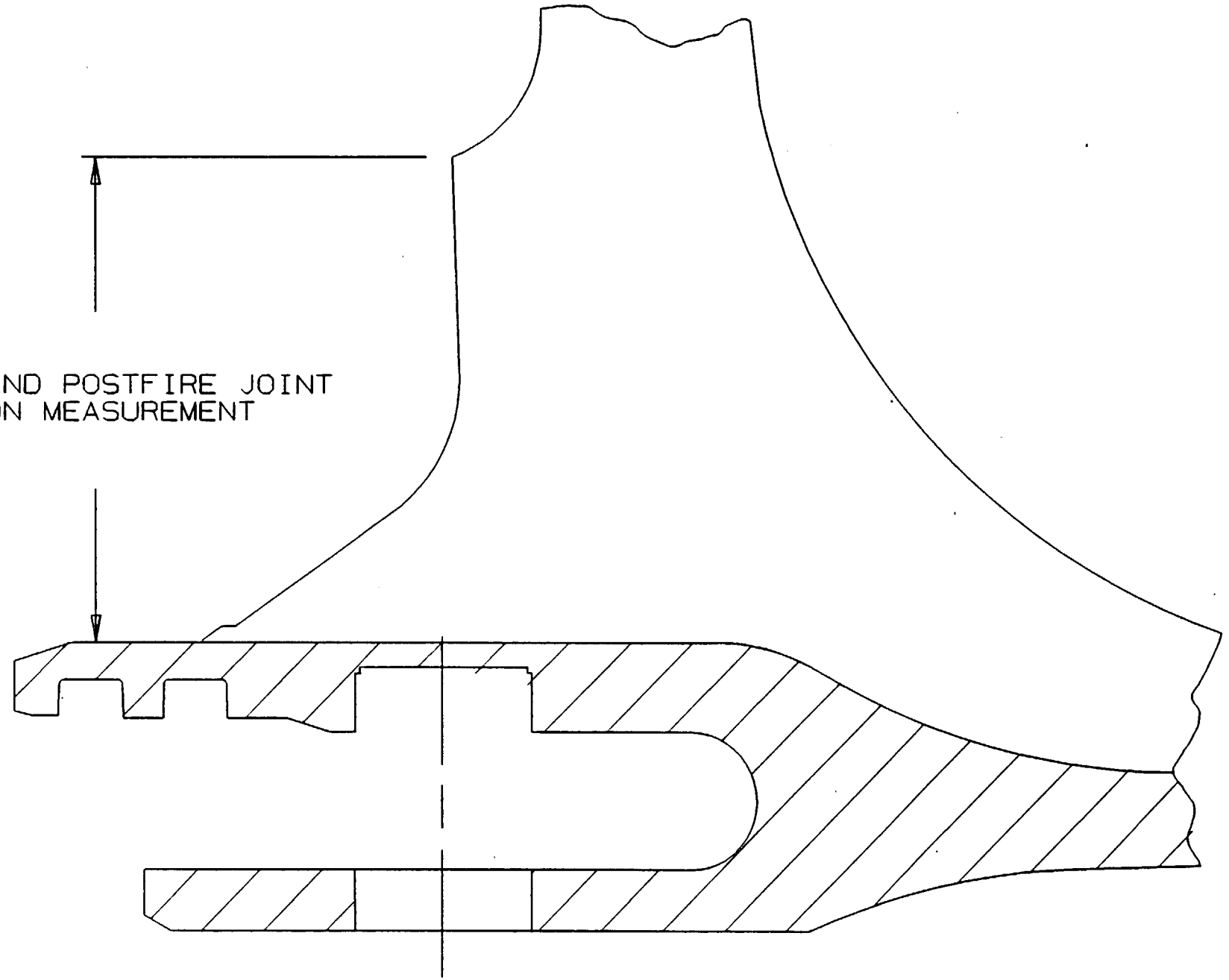


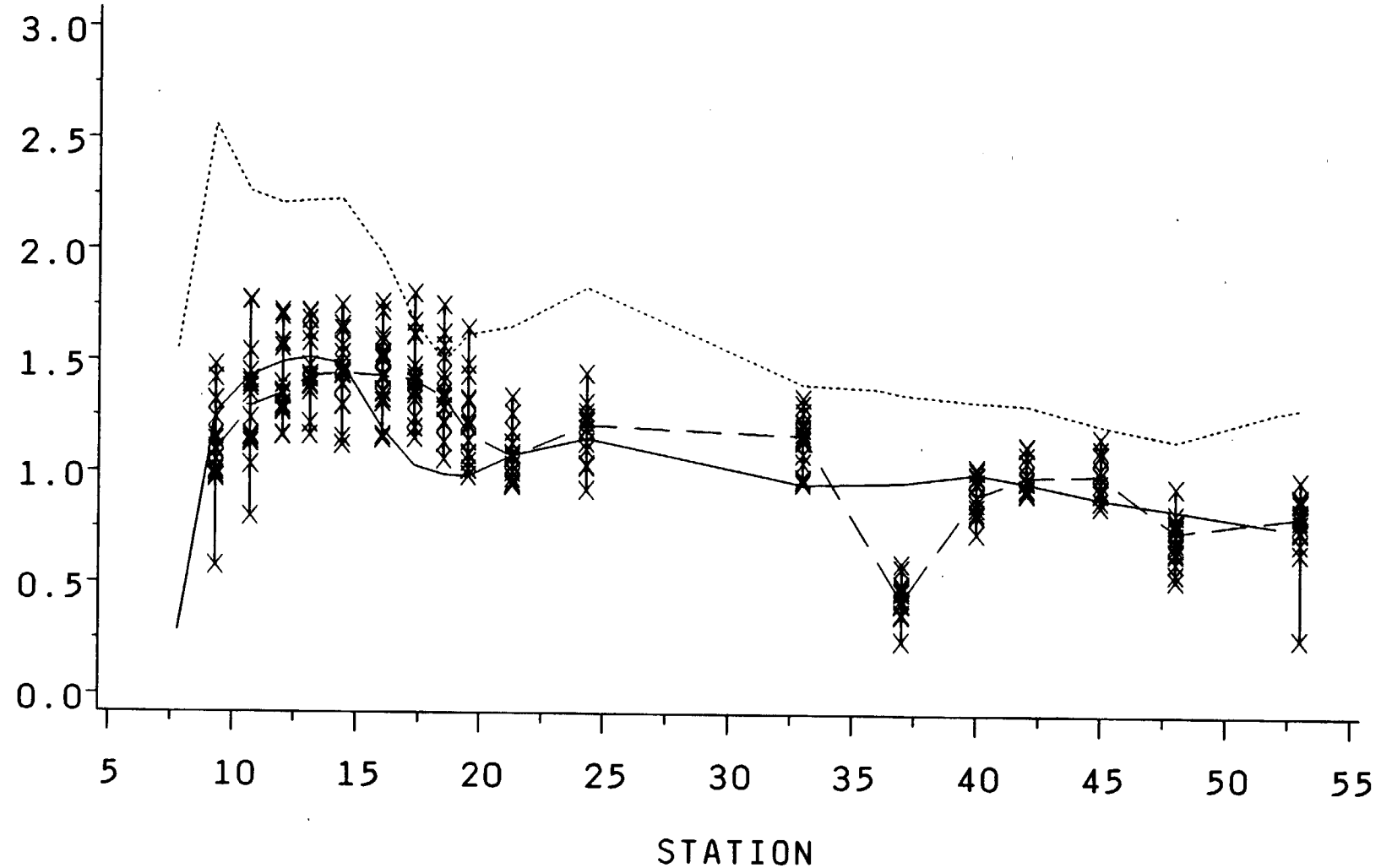
FIGURE 8

Field Joint (Clevis) Safety Factor Measurement

AFT DOME REGION

RSRM-7A AFT DOME INSULATION PERFORMANCE

FIGURE 9

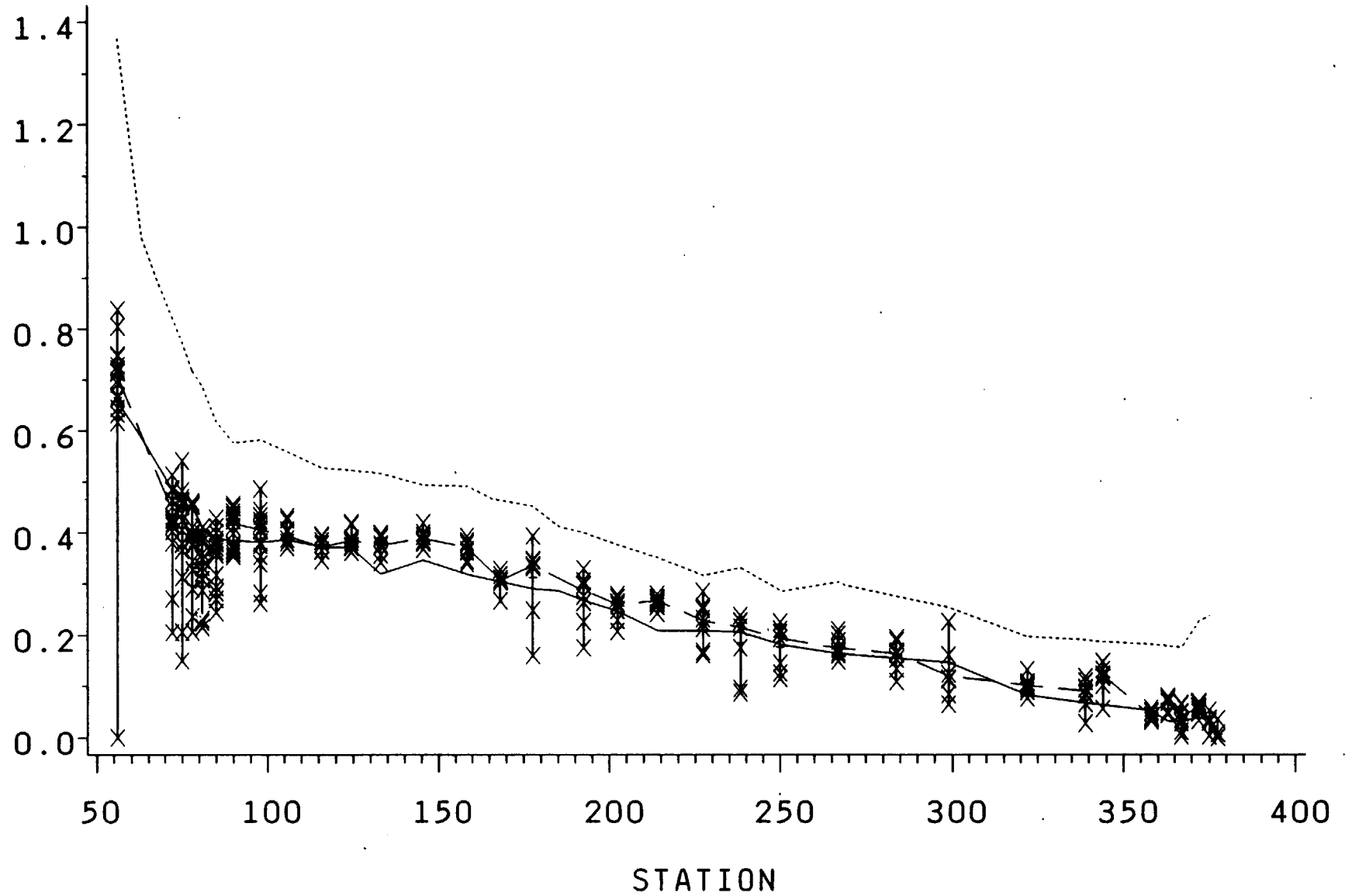


CODE ✕—✕—✕ RSRM-7A DATA — — RSRM-7A MEDIAN ——— HPM DATABASE MEDIAN ····· M+3σ DESIGN MDD

AFT CYLINDER REGION

RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

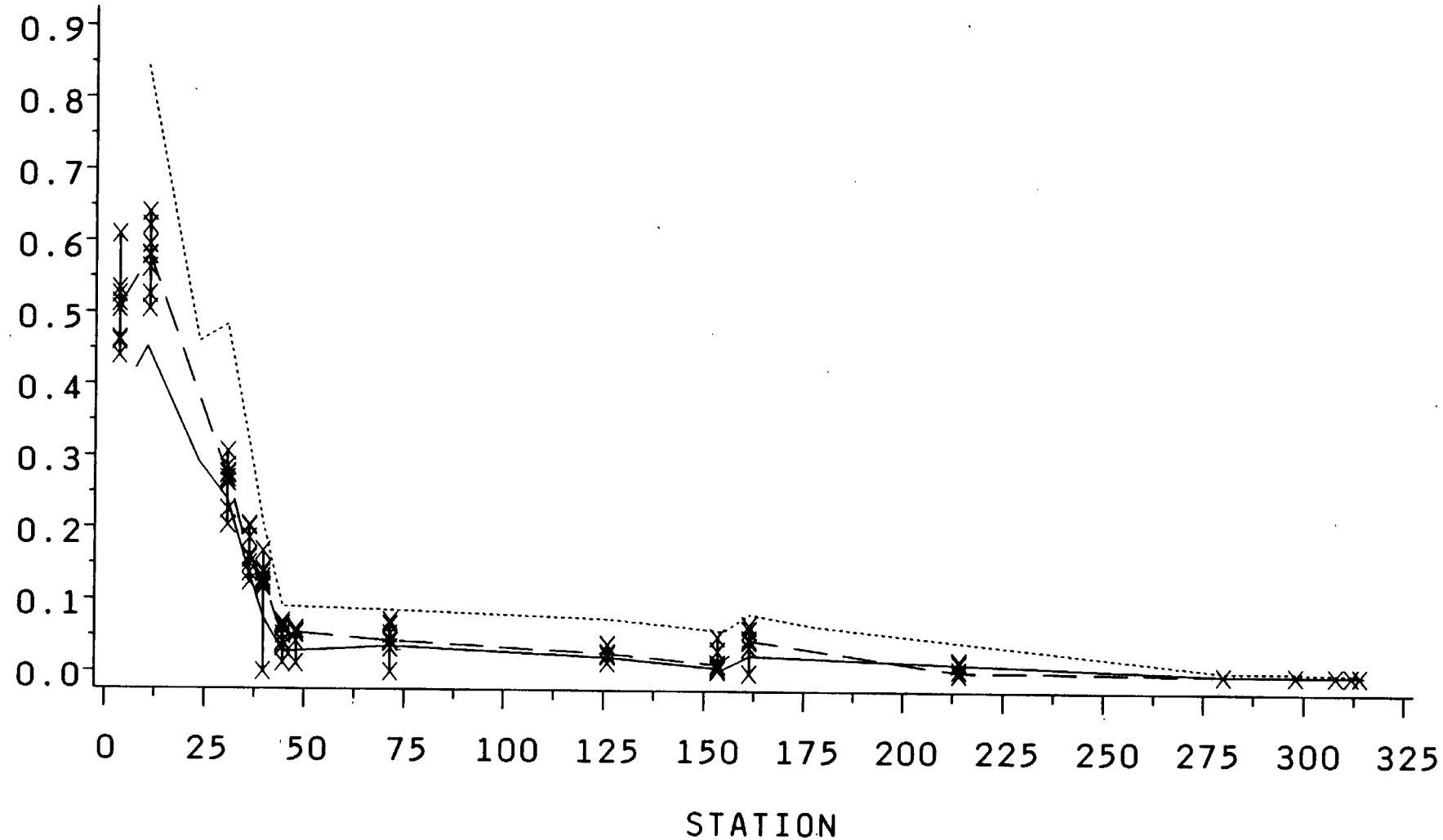
FIGURE 10



AFT CENTER SEGMENT

RSRM-7A AFT CENTER SEGMENT INSULATION PERFORMANCE

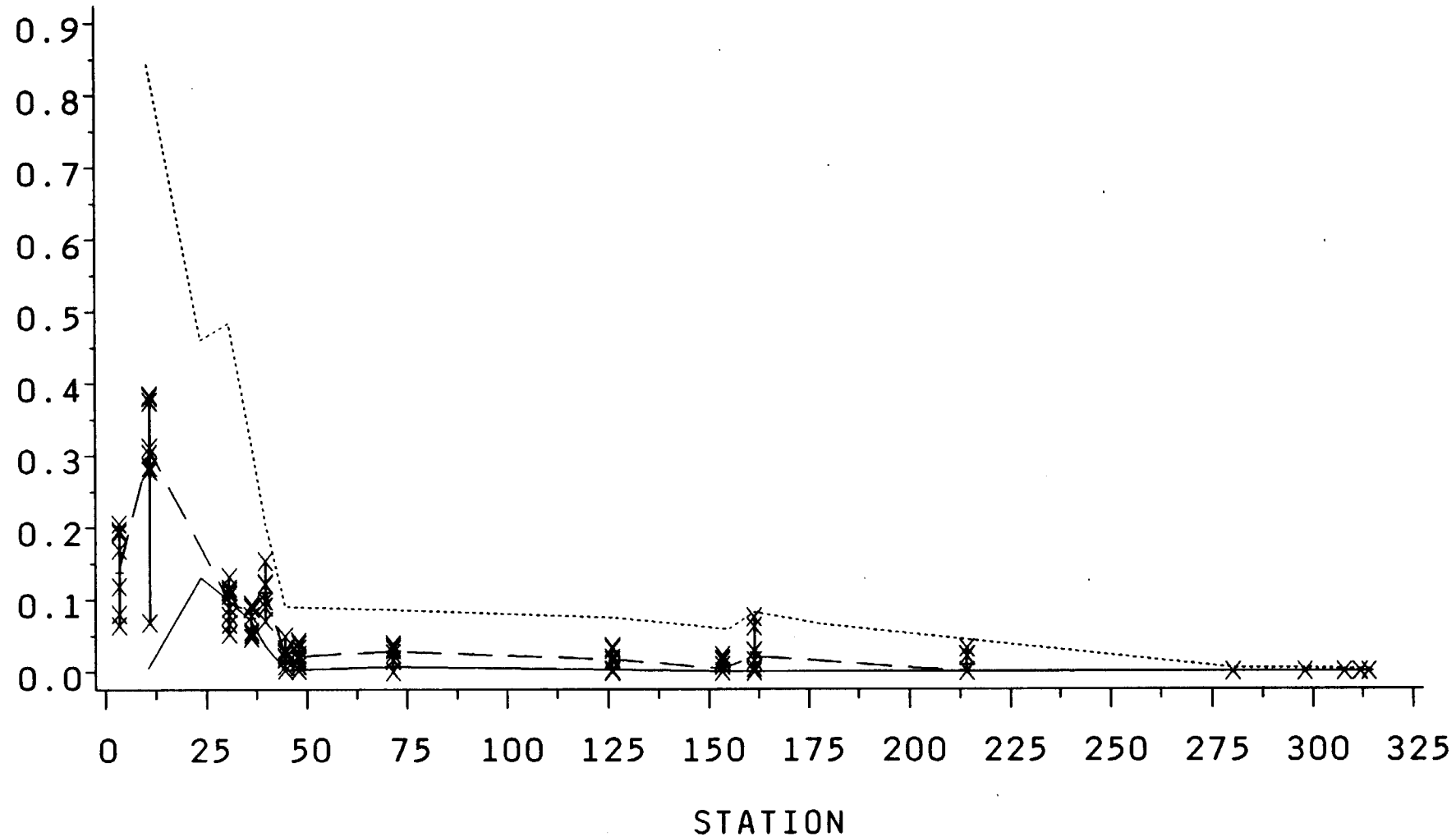
FIGURE 11



FORWARD CENTER SEGMENT

RSRM-7A FORWARD CENTER SEGMENT INSULATION PERFORMANCE

FIGURE 12

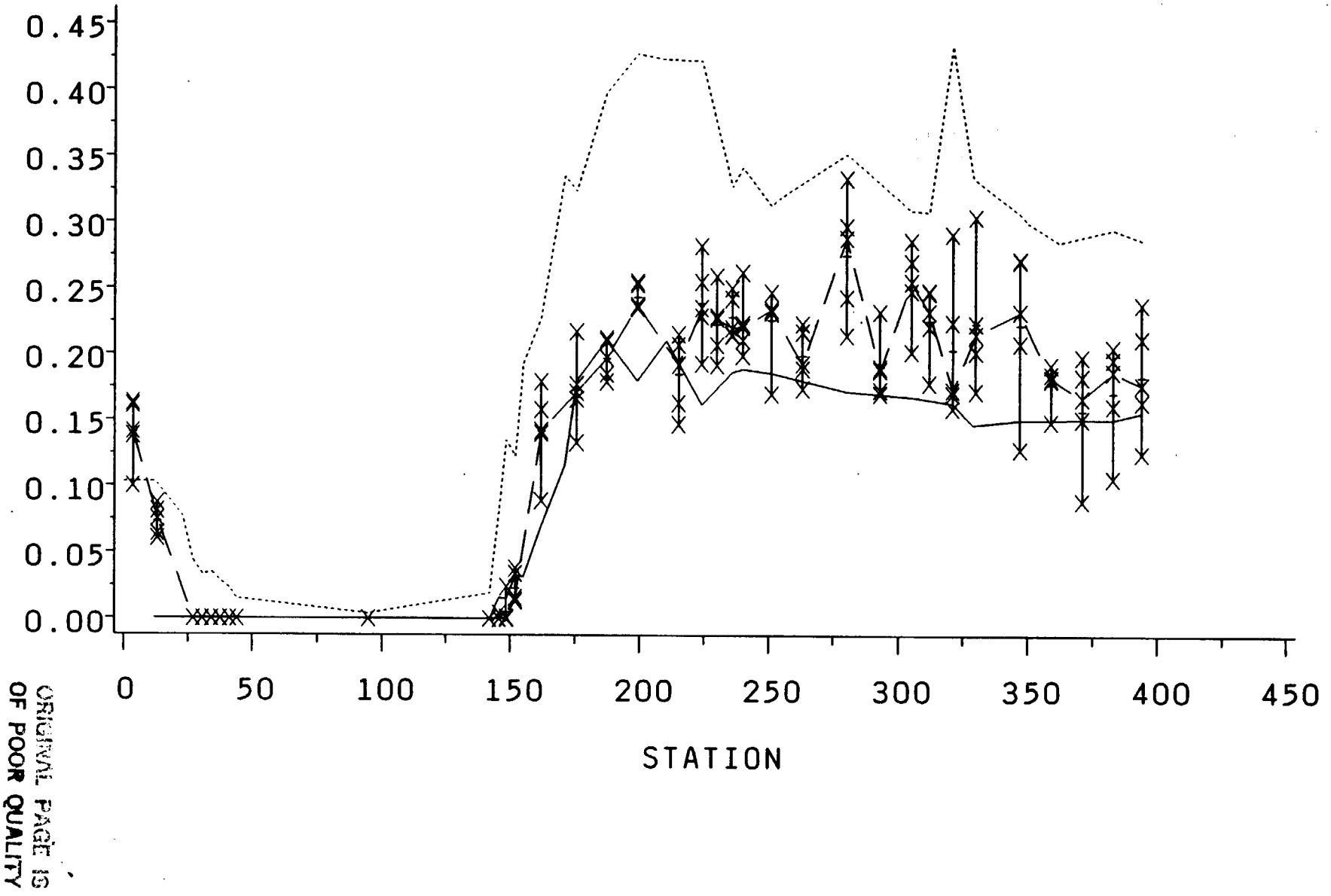


CODE — RSRM-7A DATA — RSRM-7A MEDIAN — HPM DATABASE MEDIAN ····· M+3σ DESIGN MDD

FORWARD SEGMENT
(STAR TIP REGION)

RSRM-7A FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

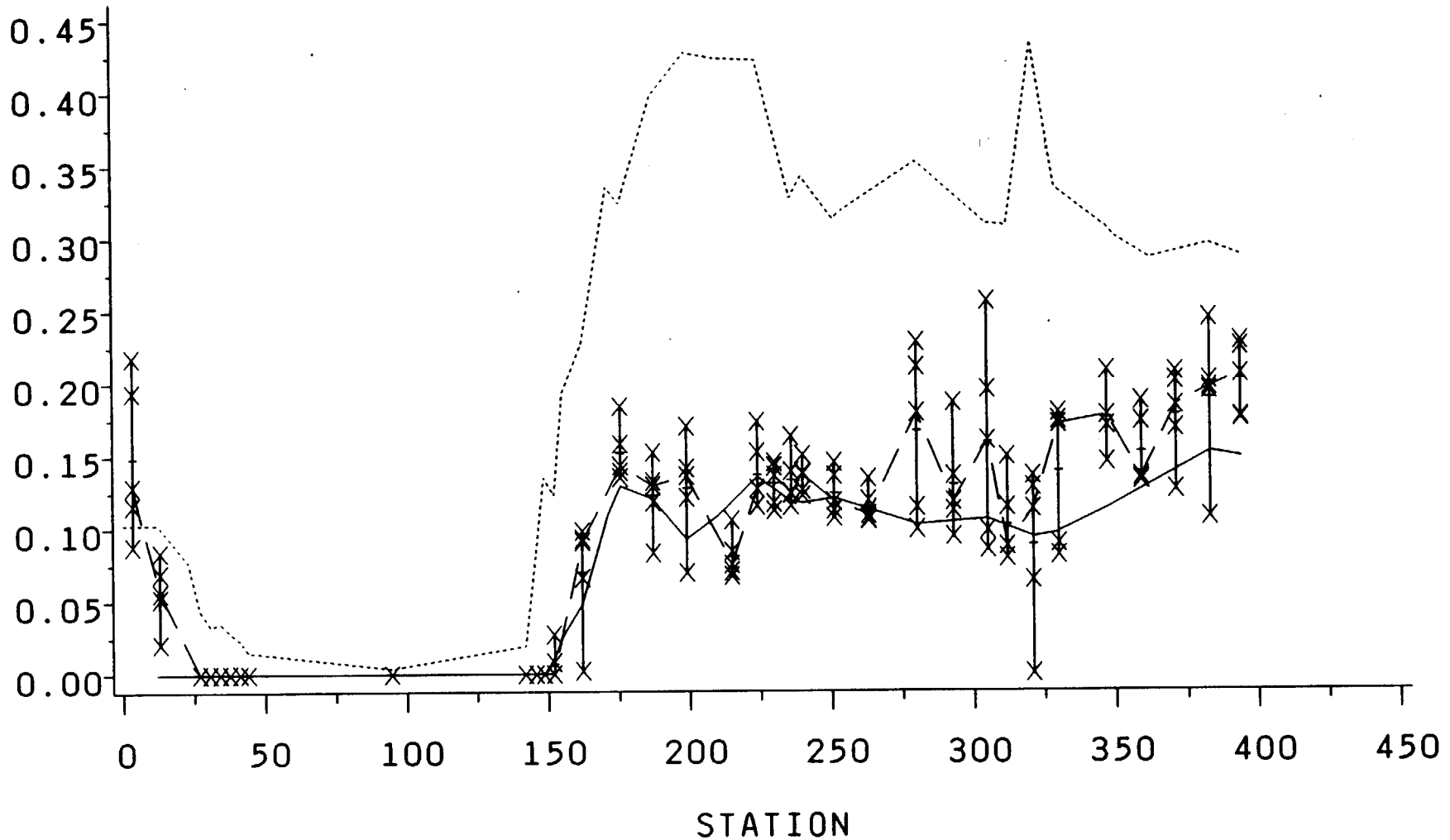
FIGURE 13

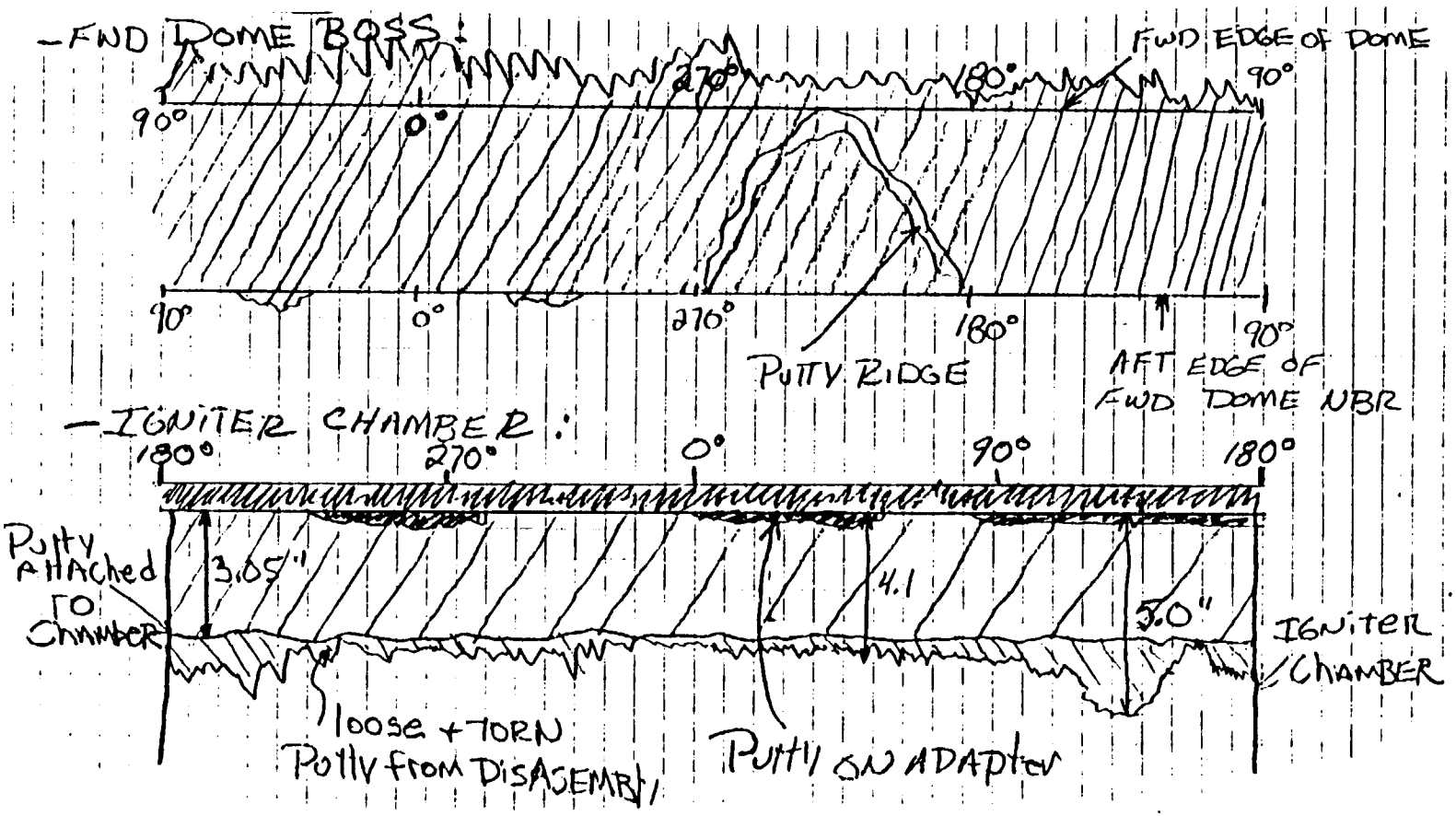


FORWARD SEGMENT
(NON-STAR TIP REGION)

RSRM-7A FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

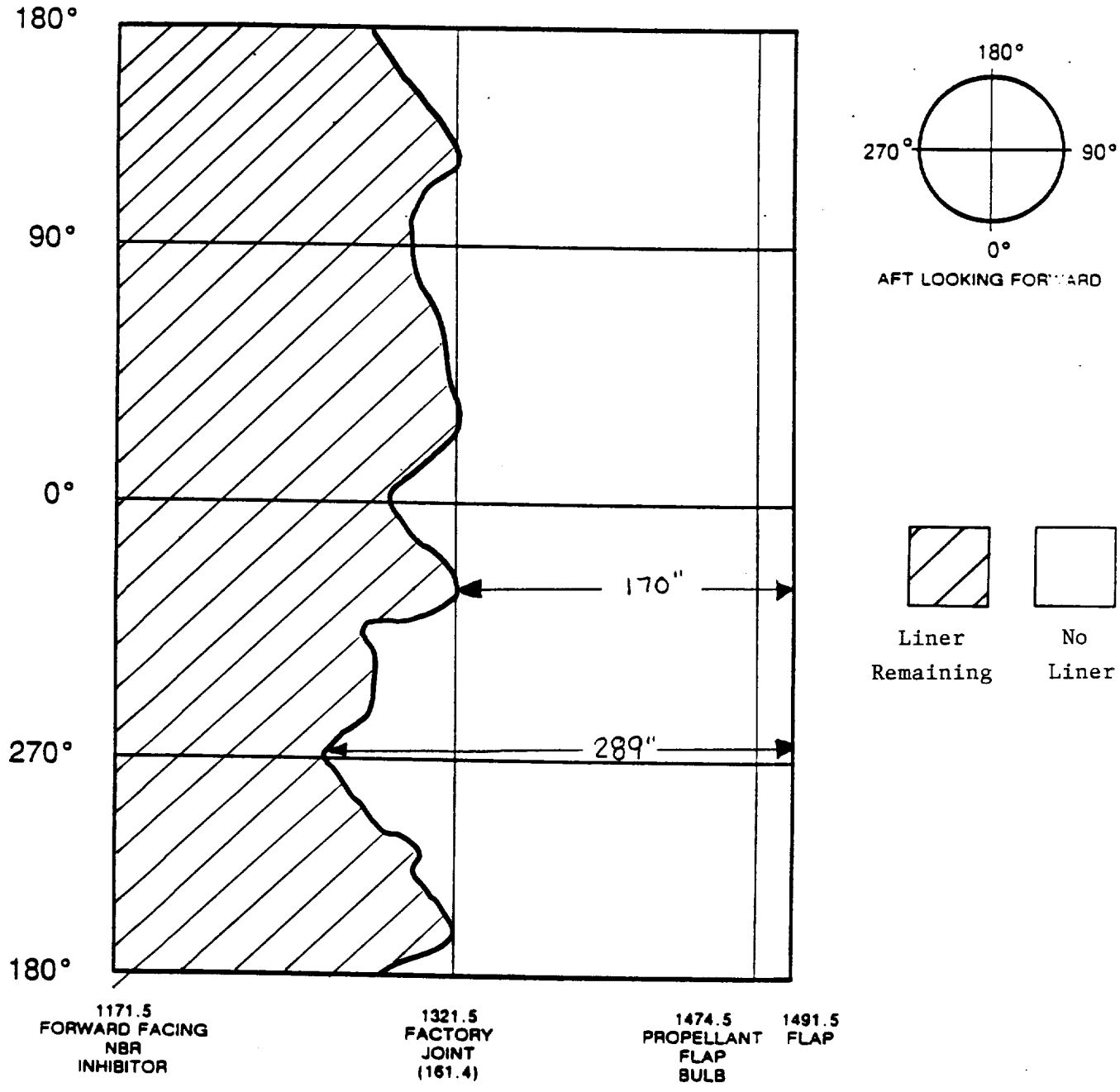
FIGURE 14



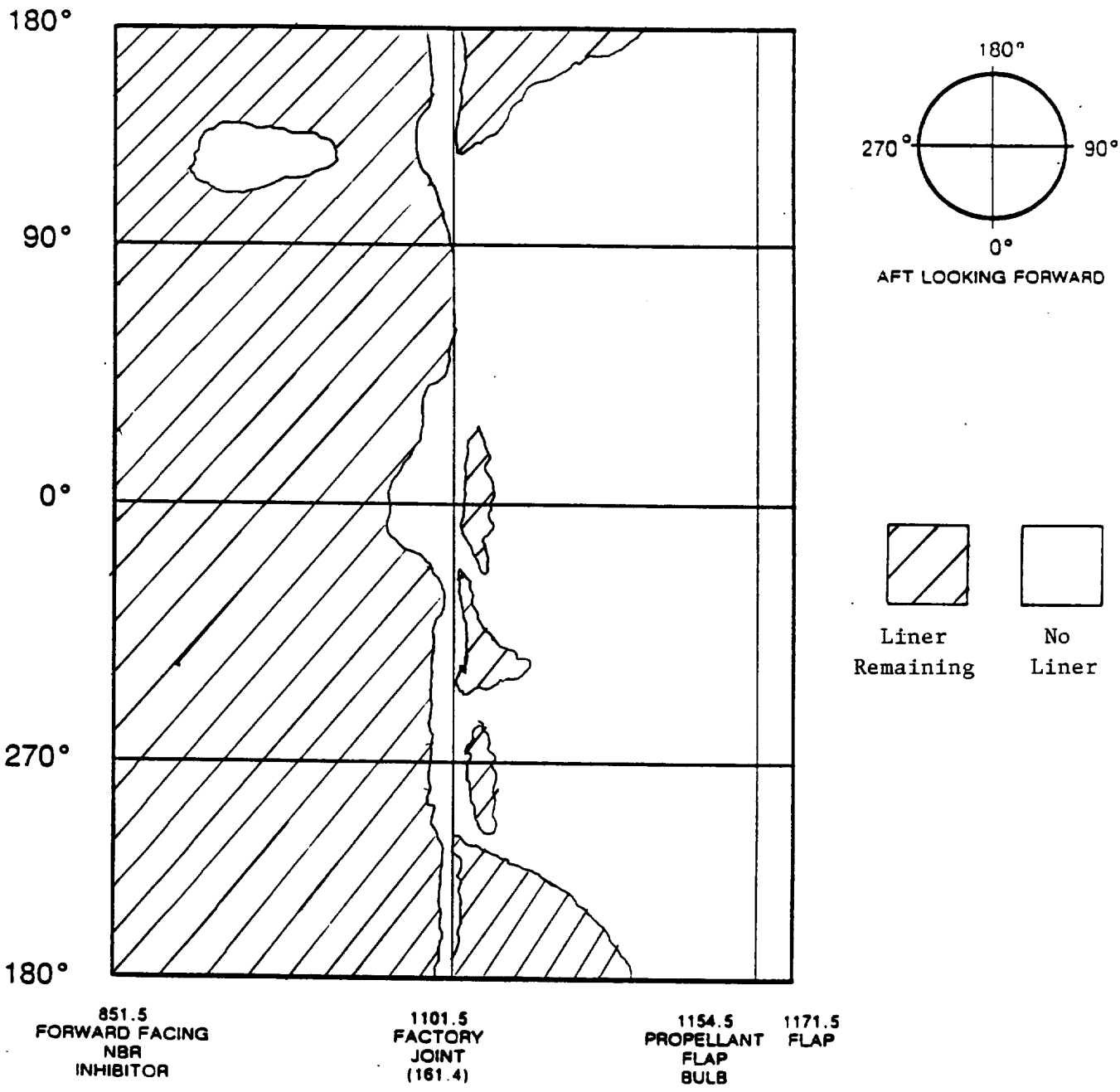


RSRM-7B Igniter to Case Joint Putty Configuration

Figure 15

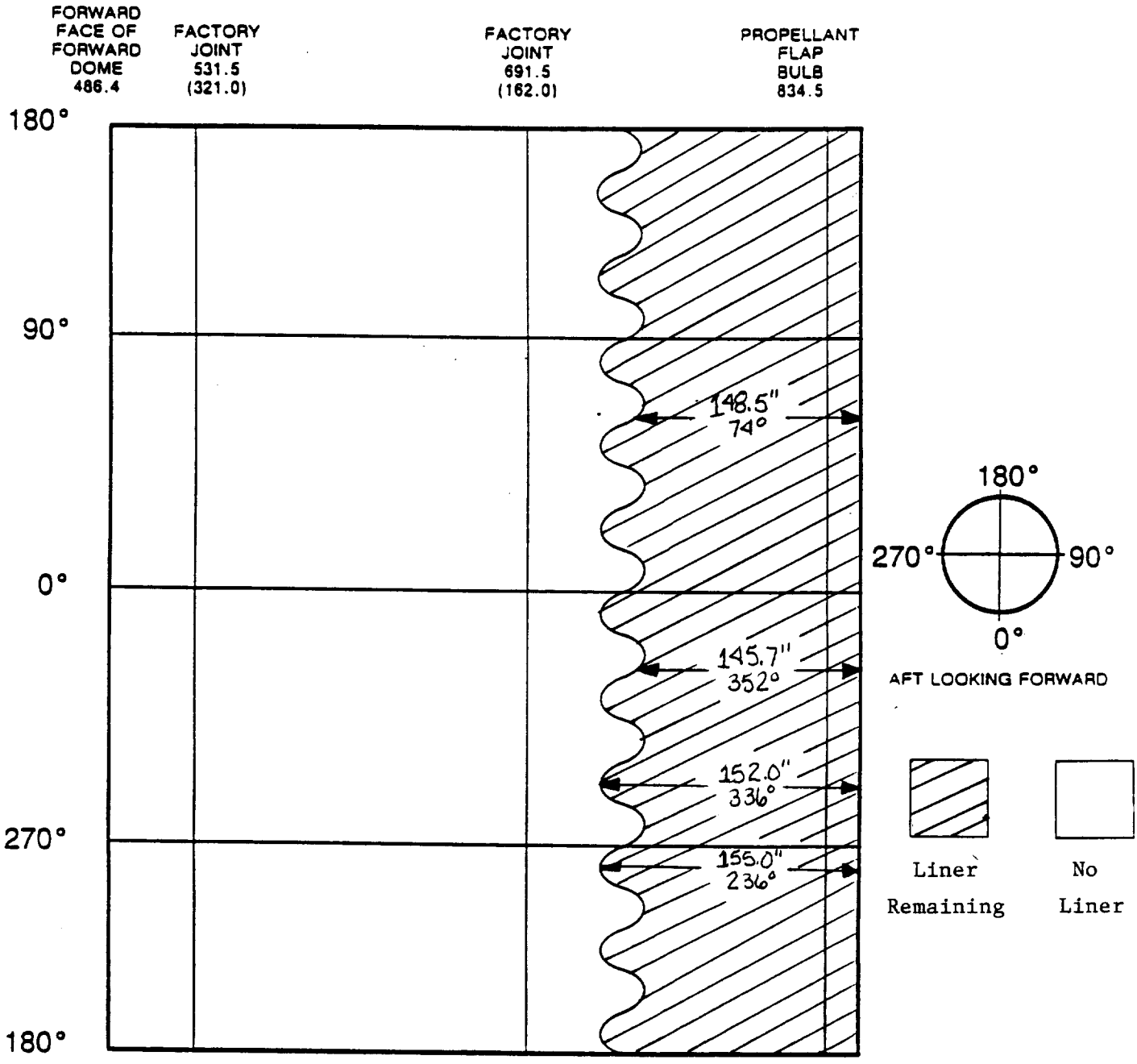


RSRM-7B Aft Center Segment Liner Pattern
Figure 16



RSRM-7B Forward Center Segment Liner Pattern

Figure 17



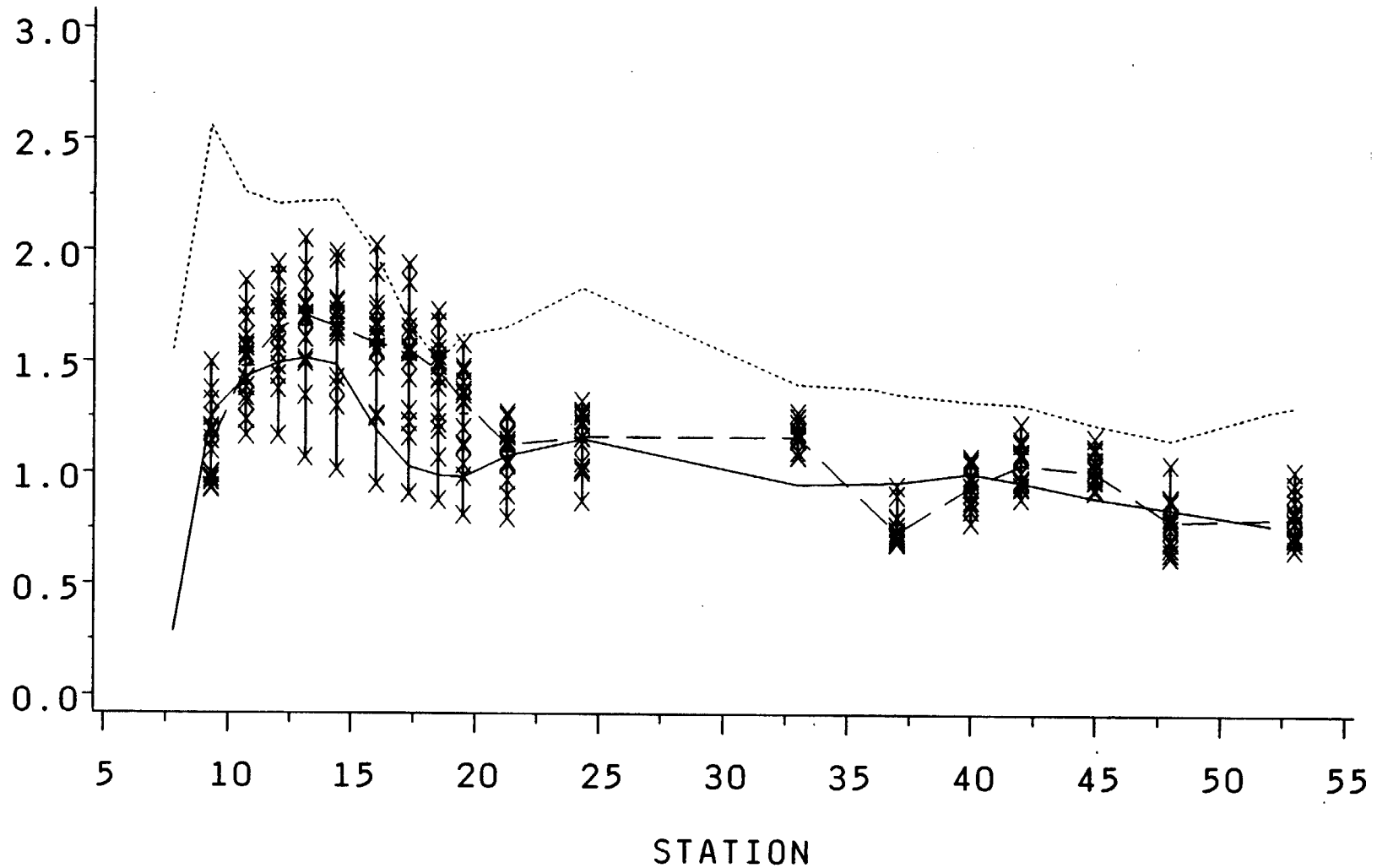
RSRM-7B Forward Segment Liner Pattern

Figure 18

AFT DOME REGION

RSRM-7B AFT DOME INSULATION PERFORMANCE

FIGURE 19

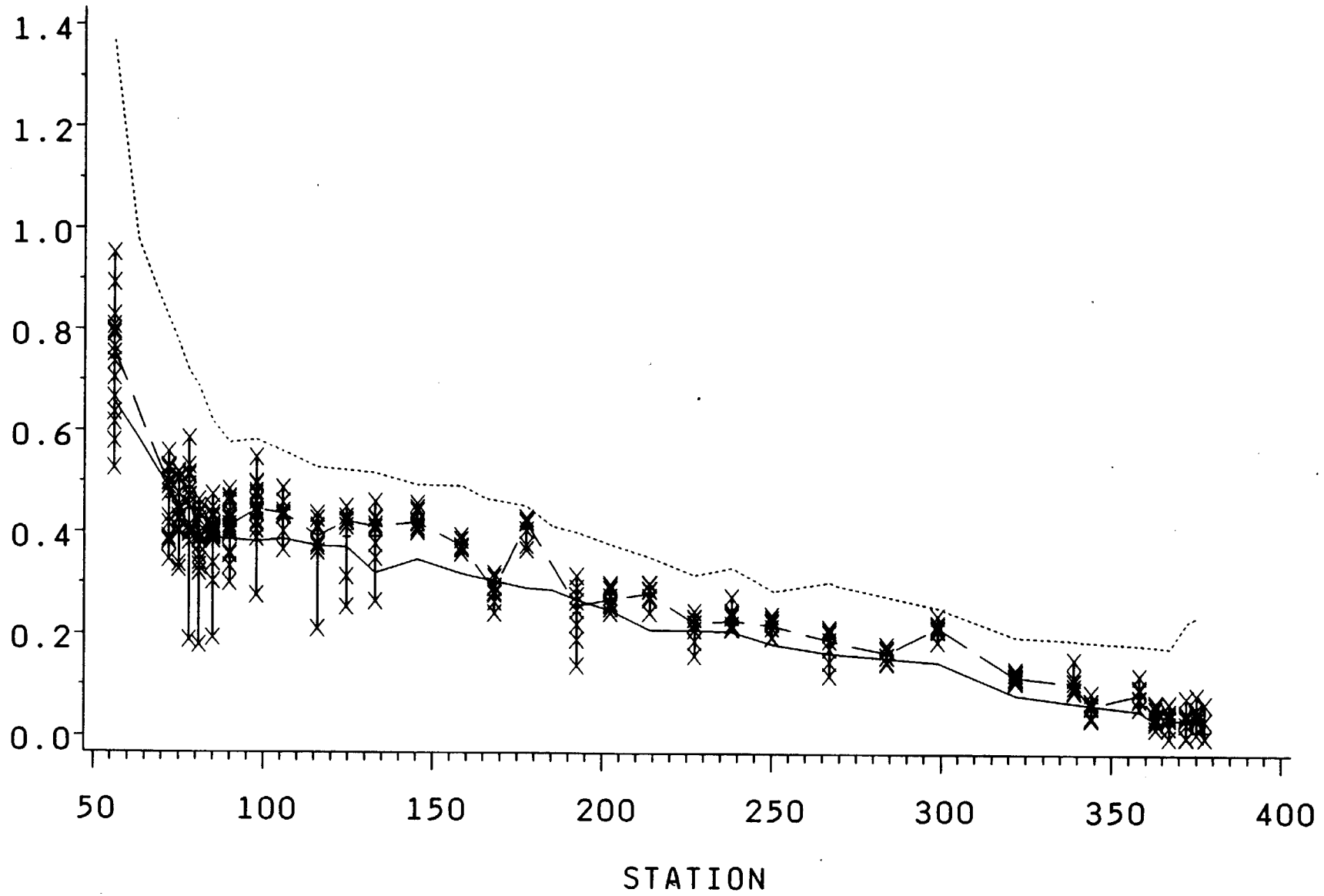


CODE ×—×—× RSRM-7B DATA — — RSRM-7B MEDIAN ——— HPM DATABASE MEDIAN ····· M+3σ DESIGN MDD

AFT CYLINDER REGION

RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

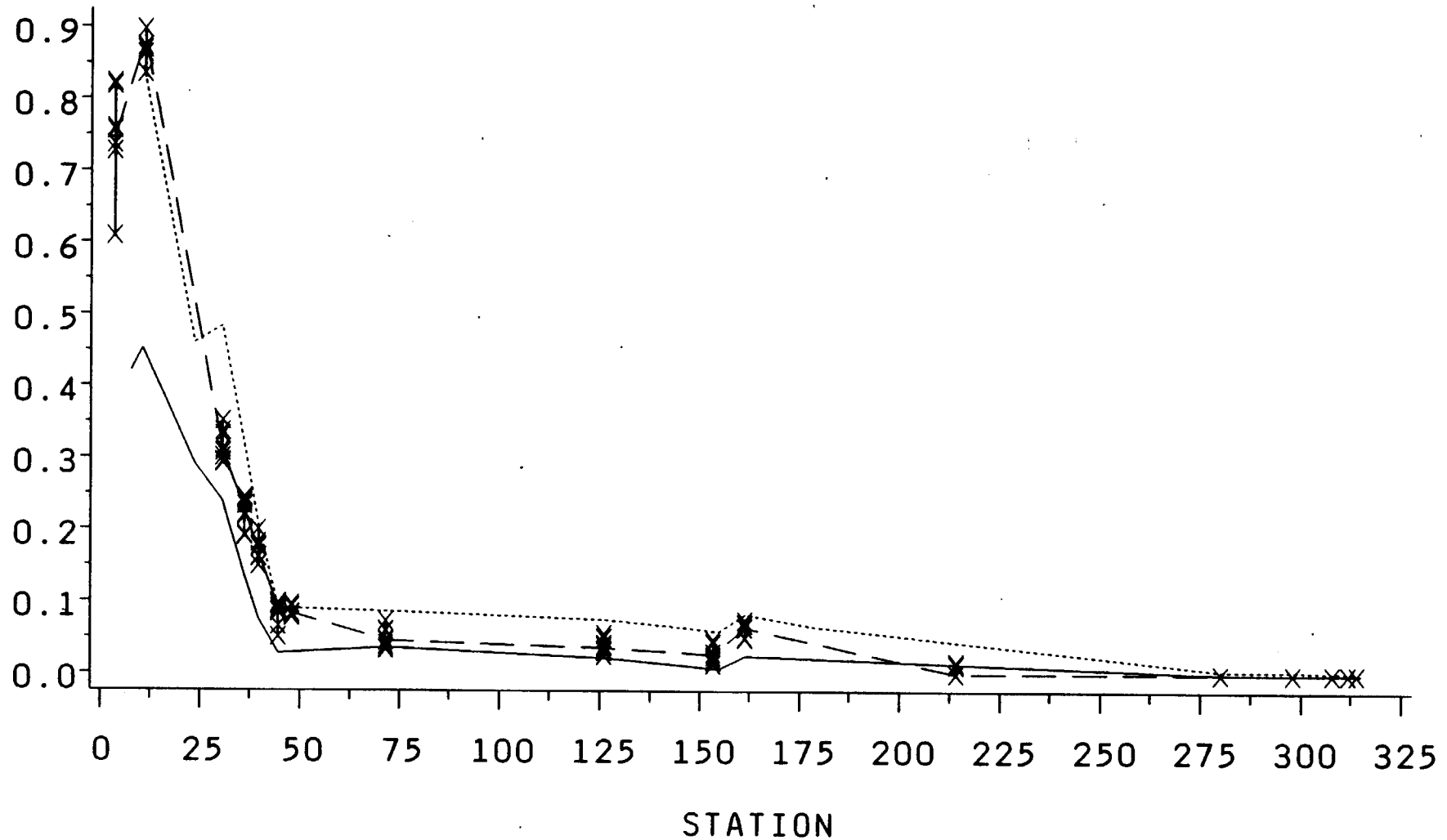
FIGURE 20



AFT CENTER SEGMENT

RSRM-7B AFT CENTER SEGMENT INSULATION PERFORMANCE

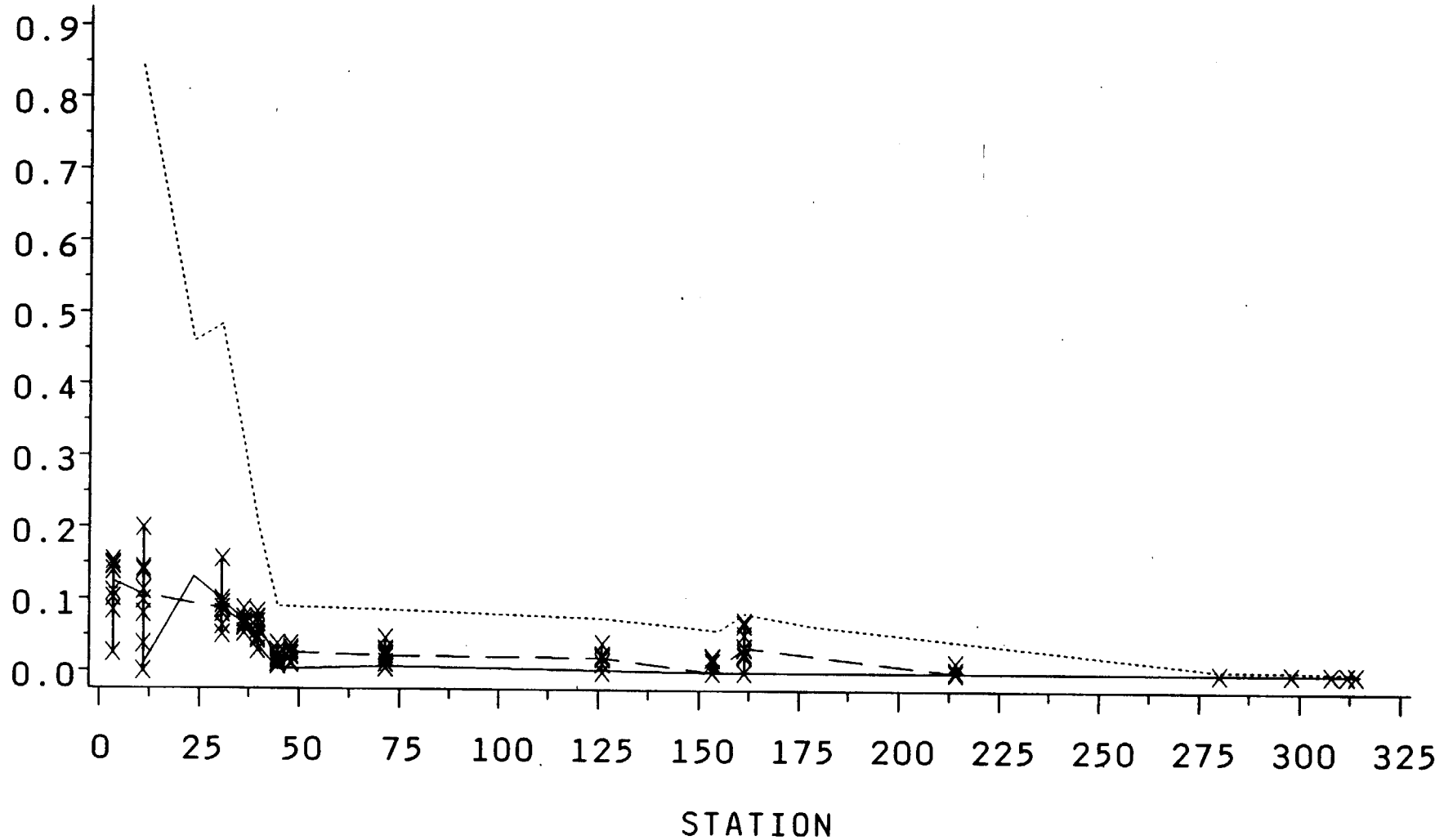
FIGURE 21



FORWARD CENTER SEGMENT

RSRM-7B FORWARD CENTER SEGMENT INSULATION PERFORMANCE

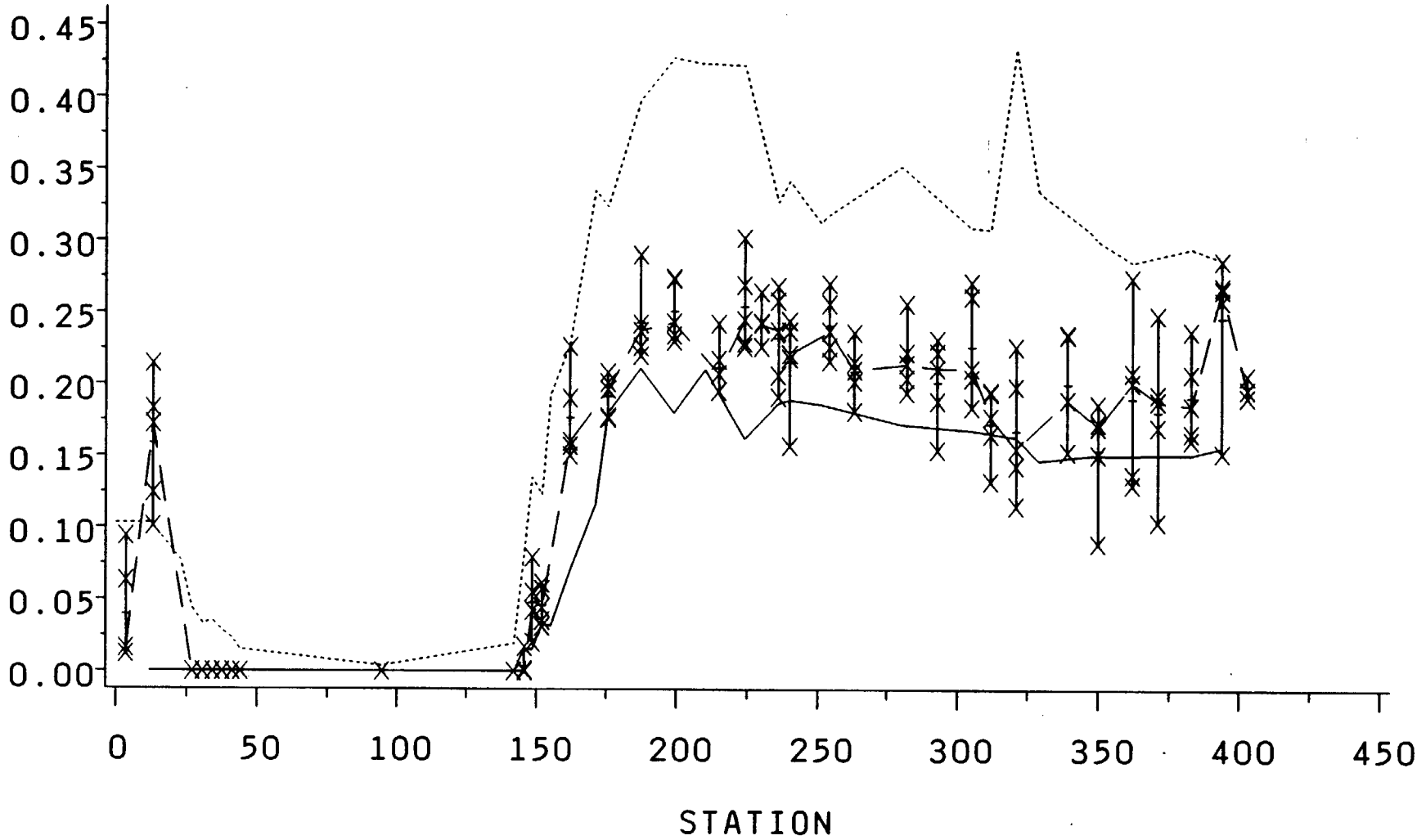
FIGURE 22



FORWARD SEGMENT
(STAR TIP REGION)

RSRM-7B FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

FIGURE 23



CODE — RSRM-7B DATA — RSRM-7B MEDIAN — HPM DATABASE MEDIAN — M+30 DESIGN MDD

FORWARD SEGMENT
(NON-STAR TIP REGION)

RSRM-7B FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

FIGURE 24

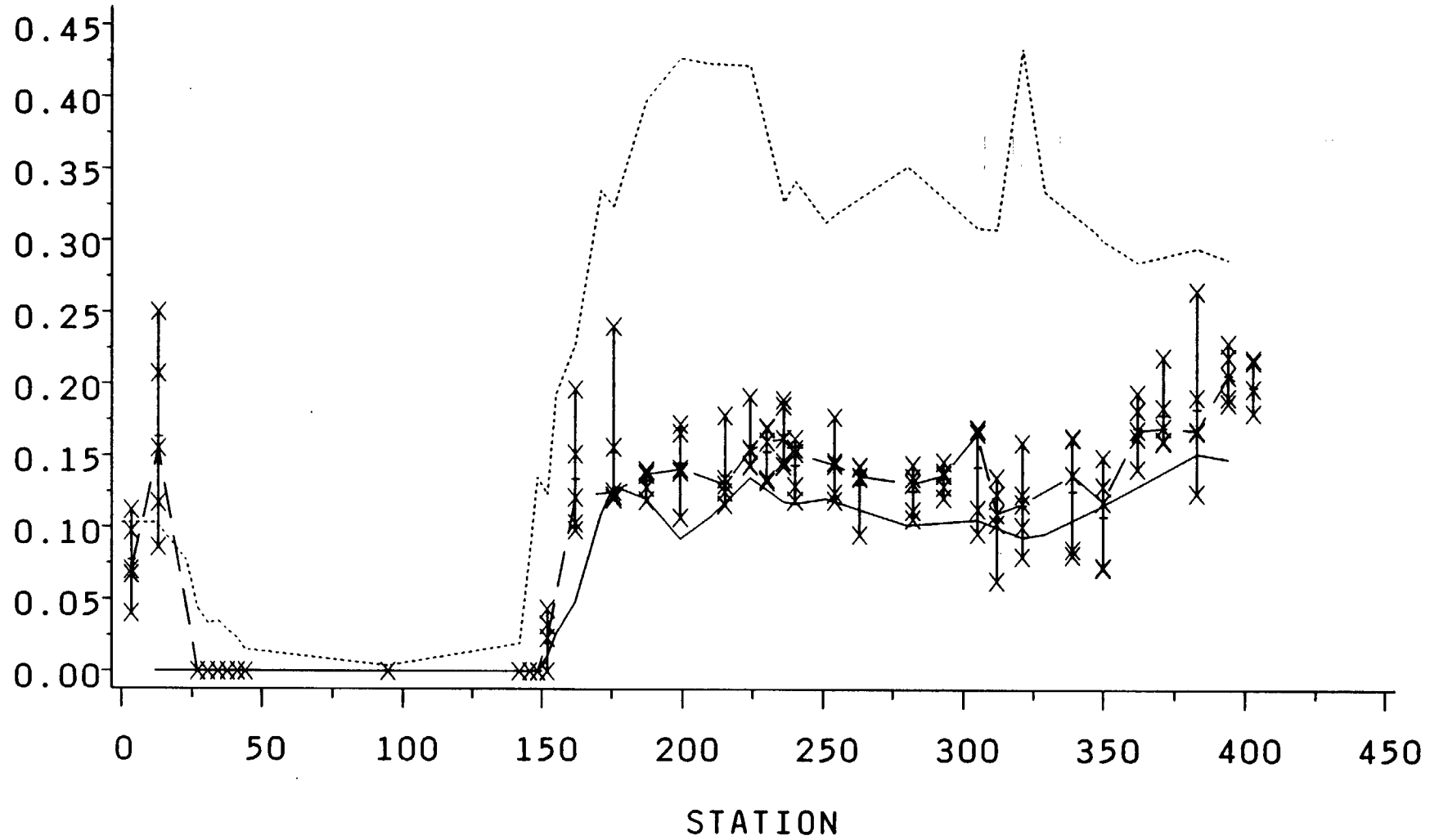


TABLE 1
SUMMARY OF NOZZLE TO CASE JOINT AND FIELD JOINT SAFETY FACTORS

JOINT	MINIMUM COMPLIANCE SAFETY FACTOR (CSF)	DEGREE LOCATION	MINIMUM ACTUAL SAFETY FACTOR (ASF)	DEGREE LOCATION
NOZZLE TO CASE A	4.6	0°	5.2	0°
NOZZLE TO CASE B	4.0	0°	4.5	0°
AFT A	5.4	210°	5.8	210°
AFT B	5.1	120°	5.4	120°
CENTER A	9.6	90°	10.5	90°
CENTER B	11.4	130°	12.1	130°
FORWARD A	12.7	166° & 180°	13.4	180°
FORWARD B	11.6	136°	12.4	136°

NOTE: ALL SAFETY FACTORS MUST MEET A 2.0 MINIMUM.

CSF = MDT/MDD
ASF = Actual Prefire Thickness/MDD

Where: MDT = Minimum Design Thickness
MDD = Material Decomposition Depth

TABLE 2
SUMMARY OF FACTORY JOINT SAFETY FACTORS

SEGMENT	STATION	MINIMUM COMPLIANCE SAFETY FACTOR (CSF)	DEGREE LOCATION	MINIMUM ACTUAL SAFETY FACTOR (ASF)	DEGREE LOCATION
AFT A	56.0"	3.33	338.4°	4.12	338.4°
AFT B	56.0"	2.93	18.0°	3.66	180.0°
AFT A	177.7"	2.54	46.8°	3.82	46.8°
AFT B	177.7"	2.34	90.0°	3.60	136.8°
AFT A	299.1"	2.99	26.8°	4.54	46.8°
AFT B	299.1"	2.85	90.0°	4.53	90.0°
AFT CTR A	161.4"	3.58	46.0°	9.70	46.0°
AFT CTR B	161.4"	3.23	180.0°	8.60	180.0°
FWD CTR A	161.4"	3.15	136.0°	7.83	136.0°
FWD CTR B	161.4"	3.32	0.0°	8.85	0.0°
FORWARD A	162.0"	3.06	286.0°	4.40	286.0°
FORWARD B	162.0"	2.42	286.0°	3.80	286.0°
FORWARD A	321.0"	3.15	352.0°	3.43	352.0°
FORWARD B	321.0"	4.06	90.0°	4.55	90.0°

NOTE: ALL FACTORY JOINT SAFETY FACTORS MUST MEET A 2.0 MINIMUM

CSF = MDT/MDD
ASF = Actual Prefire Thickness/MDD

Where: MDT = Minimum Design Thickness
MDD = Material Decomposition Depth

TABLE 3
SUMMARY OF CASE INSULATION SAFETY FACTORS

SEGMENT	MINIMUM COMPLIANCE SAFETY FACTOR (CSF)	STATION	MINIMUM ACTUAL SAFETY FACTOR (ASF)	STATION
AFT DOME A	1.92	19.5"	2.27	18.5"
AFT DOME B	1.84	17.3"	2.02	16.0"
AFT A	2.22	145.5"	2.19	145.5"
AFT B	2.04	145.5"	2.04	145.5"
AFT CTR A	2.43	71.5"	2.60	30.7"
AFT CTR B	1.99	11.0"	2.44	30.7"
FWD CTR A	2.81	39.7"	4.38	214.1"
FWD CTR B	3.32	161.4"	4.15	126.0"
FORWARD A	1.71	280.0"	2.14	280.0"
FORWARD B	1.76	394.0"	2.31	394.0"

NOTE: ALL ACREAGE AREA SAFETY FACTORS MUST MEET A MINIMUM OF 1.5.

CSF = MDT/MDD
ASF = Actual Prefire Thickness/MDD

Where: MDT = Minimum Design Thickness
MDD = Material Decomposition Depth

CRITERIA FOR CLASSIFYING POTENTIAL ANOMALIES

Remains Observation	Anomaly		
	Minor	Major	Critical
• Requires no specific action	• Requires corrective action, but has no impact on: —Motor Performance —Program Schedule • Does not reduce usability of part for its intended function • Could cause damage preventing reuse of hardware in combination with other anomaly • Significant departure from the historical data base	• Could cause failure in combination with other anomaly • Could cause damage preventing reuse of hardware • Program acceptance of cause, corrective action, and risk assessment required before subsequent static test/flight	• Violates CEI spec requirements • Could cause failure and possible loss of mission/life • Mandatory resolution before subsequent static test/flight

Note: This criteria is to be applied to the specific observed potential anomaly as it relates to the observed article and as it relates to subsequent articles

Table 4

Prefire Condition Clevis at Thiokol Corporation***

Segment	Maximum* Prefire Depth	Degree Location	Maximum Postfire Depth @ Degree	Depth After Repair	Repair Failure Depth @ Postfire	Primary Bond Failure Depth	Total Area** Unbonded
A F/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
A A/C	0.05	114,223	0.00,0.00	0.00,0.00	0.00,0.00	0.00,0.00	0.18
A Aft	0.08	179	0.00	0.00	0.00	0.00	6.17
B F/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
B A/C	0.07	326	0.00	0.00	0.00	0.00	3.29
B Aft	0.00	N/A	N/A	N/A	N/A	0.00	0.00

Postfire Condition Clevis at H-7

Segment	Maximum Postfire Depth	Degree Location	Maximum Prefire Depth @ Degree	Depth After Repair	Repair Failure Depth @ Postfire	Primary Bond Failure Depth	Total Area** Unbonded
A F/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
A A/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
A Aft	0.00	N/A	N/A	N/A	N/A	0.00	0.00
B F/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
B A/C	0.00	N/A	N/A	N/A	N/A	0.00	0.00
B Aft	0.00	N/A	N/A	N/A	N/A	0.00	0.00

* Depth Before Repair
** Total Area Full Circumference (Before Repair for Prefire)
*** No prefire PRs at KSC

RSRM-7 Final Clevis Edge Separations

Table 5

Prefire Condition Tang at Thiokol Corporation****

Segment	Maximum* Prefire Depth	Degree Location	Maximum Postfire Depth @ Degree	Depth After Repair	Repair Failure Depth @ Postfire	Primary Bond Failure Depth	Total Area** Unbonded
A FWD	0.18	272	0.00	0.00	0.00	0.00	0.69
A F/C	0.10	8	0.00	0.00	0.00	0.00	0.16
A A/C	0.12	145-149	0.00	0.00	0.00	0.00	4.95
B FWD	0.02	--	0.00	0.00	0.00	0.00	0.50
B F/C	0.08	122	0.00	0.00	0.00	0.00	0.50
B A/C	0.02	0,121	0.00,0.00	N/A	N/A	0.00***	0.04

Postfire Condition Tang at H-7

Segment	Maximum*** Postfire Depth	Degree Location	Maximum Prefire Depth @ Degree	Depth After Repair	Repair Failure Depth @ Postfire	Primary Bond Failure Depth	Total Area** Unbonded
A FWD	0.210	333-336	0.00	N/A	N/A	0.210	6.50
A F/C	0.150	279	0.00	N/A	N/A	0.150	0.24
A A/C	0.175	200-204	0.03	0.00	0.03	0.145	0.70
B FWD	0.00	N/A	N/A	--	0.00	0.00	0.50
B F/C	0.05	114	0.03	0.00	0.03	0.02	0.01
B A/C	0.25	173-174	0.00	N/A	N/A	0.25	13.7

* Depth Before Repair
** Total Area Full Circumference (Before Repair for Prefire)
*** Depth < 0.05 not documented at H-7
**** No prefire PRs at KSC, No postfire inspection at KSC

RSRM-7 Final Tang Edge Separations

Table 6

RSRM-7A NOZZLE TO CASE JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
0.0	5.577	4.510	1.067	4.6	5.2
21.6	5.638	4.815	0.823	6.0	6.9
46.8	5.551	4.575	0.976	5.0	5.7
68.4	5.610	4.797	0.813	6.0	6.9
90.0	5.561	4.964	0.597	8.2	9.3
111.6	5.532	4.810	0.722	6.8	7.7
136.8	5.628	4.978	0.650	7.5	8.7
158.4	5.588	4.905	0.683	7.2	8.2
180.0	5.578	4.628	0.950	5.2	5.9
201.6	5.595	4.798	0.797	6.1	7.0
226.8	5.613	4.710	0.903	5.4	6.2
248.4	5.599	4.961	0.638	7.7	8.8
270.0	5.617	5.138	0.479	10.2	11.7
291.6	5.603	4.922	0.681	7.2	8.2
316.8	5.599	5.100	0.499	9.8	11.2
338.4	5.612	4.953	0.659	7.4	8.5
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	5.599	4.860	0.703	4.6	5.2

Table 7

RSRM-7A AFT FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.757	2.332	0.425	6.1	6.5
16.0	2.730	2.336	0.394	6.6	6.9
30.0	2.735	2.404	0.331	7.8	8.3
46.0	2.762	2.335	0.427	6.1	6.5
60.0	2.750	2.314	0.436	6.0	6.3
76.0	2.753	2.278	0.475	5.5	5.8
90.0	2.750	2.317	0.433	6.0	6.4
106.0	2.760	2.304	0.456	5.7	6.1
120.0	2.755	2.298	0.457	5.7	6.0
136.0	2.765	2.357	0.408	6.4	6.8
150.0	2.750	2.342	0.408	6.4	6.7
166.0	2.747	2.338	0.409	6.3	6.7
180.0	2.762	2.312	0.450	5.8	6.1
196.0	2.730	2.285	0.445	5.8	6.1
210.0	2.765	2.288	0.477	5.4	5.8
226.0	2.725	2.301	0.424	6.1	6.4
242.0	2.740	2.352	0.388	6.7	7.1
256.0	2.739	2.335	0.404	6.4	6.8
270.0	2.735	2.374	0.361	7.2	7.6
286.0	2.732	2.351	0.381	6.8	7.2
300.0	2.738	2.326	0.412	6.3	6.6
316.0	2.744	2.347	0.397	6.5	6.9
330.0	2.740	2.426	0.314	8.3	8.7
346.0	2.742	2.392	0.350	7.4	7.8
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.746	2.335	0.411	5.4	5.8

Table 8

RSRM-7A CENTER FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.775	2.534	0.241	10.8	11.5
16.0	2.775	2.518	0.257	10.1	10.8
30.0	2.766	2.559	0.207	12.5	13.4
46.0	2.756	2.566	0.190	13.7	14.5
60.0	2.739	2.532	0.207	12.5	13.2
76.0	2.813	2.570	0.243	10.7	11.6
90.0	2.814	2.545	0.269	9.6	10.5
106.0	2.748	2.549	0.199	13.0	13.8
120.0	2.728	2.540	0.188	13.8	14.5
136.0	2.716	2.585	0.131	19.8	20.7
150.0	2.720	2.580	0.140	18.5	19.4
166.0	2.705	2.552	0.153	17.0	17.7
180.0	2.715	2.586	0.129	20.1	21.0
196.0	2.735	2.580	0.155	16.7	17.6
210.0	2.734	2.615	0.119	21.8	23.0
226.0	2.715	2.595	0.120	21.6	22.6
242.0	2.729	2.566	0.163	15.9	16.7
256.0	2.769	2.562	0.207	12.5	13.4
270.0	2.730	2.609	0.121	21.4	22.6
286.0	2.733	2.570	0.163	15.9	16.8
300.0	2.738	2.592	0.146	17.8	18.8
316.0	2.728	2.588	0.140	18.5	19.5
330.0	2.735	2.595	0.140	18.5	19.5
346.0	2.732	2.534	0.198	13.1	13.8
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.734	2.568	0.163	9.6	10.5

Table 9

RSRM-7A FORWARD FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.715	2.542	0.173	15.0	15.7
16.0	2.709	2.600	0.109	23.8	24.9
30.0	2.739	2.572	0.167	15.5	16.4
46.0	2.728	2.650	0.078	33.3	35.0
60.0	2.733	2.560	0.173	15.0	15.8
76.0	2.749	2.565	0.184	14.1	14.9
90.0	2.750	2.571	0.179	14.5	15.4
106.0	2.741	2.606	0.135	19.2	20.3
120.0	2.752	2.670	0.082	31.6	33.6
136.0	2.748	2.588	0.160	16.2	17.2
150.0	2.758	2.594	0.164	15.8	16.8
166.0	2.760	2.556	0.204	12.7	13.5
180.0	2.736	2.532	0.204	12.7	13.4
196.0	2.715	2.555	0.160	16.2	17.0
210.0	2.730	2.545	0.185	14.0	14.8
226.0	2.744	2.570	0.174	14.9	15.8
242.0	2.731	2.568	0.163	15.9	16.8
256.0	2.740	2.565	0.175	14.8	15.7
270.0	2.738	2.602	0.136	19.1	20.1
286.0	2.735	2.569	0.166	15.6	16.5
300.0	2.746	2.579	0.167	15.5	16.4
316.0	2.733	2.581	0.152	17.1	18.0
330.0	2.723	2.568	0.155	16.7	17.6
346.0	2.725	2.580	0.145	17.9	18.8
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.737	2.570	0.165	12.7	13.4

Table 10

TABLE 11
RSRM-7A AFT DOME INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
9.3	4.24	3.95	3.70	3.71	3.31	3.45	4.45	4.90	4.98	8.49	5.05	4.65	4.30	4.50	4.85	4.67	3.31	90.0	1.5
10.7	3.25	3.41	3.37	3.05	2.66	2.65	3.33	5.88	4.55	4.12	4.56	4.16	3.49	3.79	4.04	4.07	2.65	111.6	1.5
12.0	3.23	3.34	2.85	2.89	2.65	2.62	2.84	3.86	3.51	3.47	3.88	3.54	3.23	3.35	3.32	3.46	2.62	111.6	1.5
13.1	2.91	3.08	2.50	2.65	2.51	2.55	2.72	3.70	3.10	3.10	3.54	3.03	3.00	3.16	3.00	3.01	2.50	46.8	1.5
14.4	2.81	2.85	2.34	2.62	2.47	2.50	2.68	3.66	2.95	3.15	3.56	2.86	2.76	3.16	2.94	2.84	2.34	46.8	1.5
16.0	2.39	2.65	2.20	2.49	2.46	2.15	2.51	3.25	2.88	2.84	3.29	2.79	2.35	2.66	2.78	2.64	2.15	111.6	1.5
17.3	2.20	2.54	2.13	2.41	2.54	1.98	2.47	3.09	2.87	2.64	2.97	2.51	2.21	2.69	2.61	2.48	1.98	111.6	1.5
18.5	2.15	2.60	2.21	2.39	2.74	1.92	2.48	3.18	2.96	2.76	2.97	2.34	2.07	2.61	2.53	2.52	1.92	111.6	1.5
19.5	2.12	2.91	2.39	2.61	2.92	1.92	2.56	3.01	3.21	3.11	3.11	2.37	2.20	2.77	2.59	2.76	1.92	111.6	1.5
21.3	2.33	2.94	2.61	2.61	2.93	2.20	2.76	2.71	3.08	3.12	3.02	2.60	2.49	2.85	3.10	2.73	2.20	111.6	1.5
24.3	2.03	2.36	2.31	2.36	2.40	2.86	2.67	2.46	2.84	3.19	2.59	2.37	2.46	2.24	2.46	2.36	2.03	0.0	1.5
33.0	3.35	2.44	2.74	2.39	2.66	2.77	2.79	3.05	2.70	2.74	2.51	3.28	3.30	2.95	2.62	2.61	2.39	68.4	1.5
37.0	6.95	6.19	6.16	4.36	5.42	5.92	4.52	5.31	5.18	6.28	5.52	6.25	5.58	7.14	6.97	10.48	4.36	68.4	1.5
40.0	2.56	2.61	2.53	2.63	3.19	3.06	2.99	2.90	2.69	2.88	3.14	2.88	3.54	2.89	2.62	2.71	2.53	46.8	1.5
42.0	2.32	2.31	2.31	2.39	2.59	2.84	2.76	2.67	2.46	2.69	2.77	2.66	2.83	2.78	2.31	2.31	2.31	21.6	1.5
45.0	2.38	2.23	2.33	2.34	2.54	3.03	2.70	2.79	2.38	2.94	2.83	2.61	2.79	2.77	2.39	2.60	2.23	21.6	1.5
48.0	3.15	2.75	3.55	3.83	3.33	3.26	3.38	4.92	3.43	3.72	4.68	3.32	3.95	4.28	4.00	3.31	2.75	21.6	1.5
53.0	4.51	3.45	4.18	3.80	3.84	4.06	4.85	12.71	4.29	4.85	4.45	5.18	3.73	4.10	3.74	4.01	3.45	21.6	1.5

SEGMENT MINIMUM = 1.92 AT THE 19.5 INCH STATION

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
9.3	4.47	4.26	4.08	4.09	3.61	3.77	4.81	5.35	5.43	9.27	5.45	5.03	4.64	4.82	5.18	4.92	3.61	90.0	1.5
10.7	3.56	3.73	3.75	3.38	2.93	2.93	3.64	6.53	5.01	4.48	4.98	4.53	3.81	4.18	4.47	4.45	2.93	111.6	1.5
12.0	3.61	3.69	3.22	3.24	2.94	2.93	3.14	4.33	3.90	3.82	4.26	3.91	3.56	3.73	3.71	3.87	2.93	111.6	1.5
13.1	3.26	3.41	2.84	2.96	2.79	2.85	3.00	4.40	3.44	3.42	3.92	3.36	3.35	3.50	3.38	3.39	2.79	90.0	1.5
14.4	3.07	3.06	2.59	2.87	2.68	2.73	2.87	4.00	3.19	3.39	3.85	3.08	3.00	3.45	3.25	3.09	2.59	46.8	1.5
16.0	2.66	2.91	2.47	2.77	2.72	2.39	2.74	3.60	3.17	3.13	3.66	3.08	2.63	2.97	3.13	2.92	2.39	111.6	1.5
17.3	2.51	2.87	2.48	2.77	2.89	2.27	2.80	3.54	3.26	2.99	3.43	2.87	2.55	3.09	3.04	2.82	2.27	111.6	1.5
18.5	2.49	3.00	2.61	2.78	3.15	2.27	2.87	3.69	3.46	3.19	3.50	2.58	2.43	3.06	3.02	2.93	2.27	111.6	1.5
19.5	2.53	3.44	2.90	3.12	3.44	2.31	3.03	3.58	3.84	3.68	3.79	2.87	2.66	3.33	3.18	3.29	2.31	111.6	1.5
21.3	2.80	3.52	3.24	3.14	3.51	2.69	3.33	3.27	3.71	3.73	3.72	3.22	3.07	3.47	3.86	3.29	2.69	111.6	1.5
24.3	2.42	2.79	2.81	2.80	2.89	3.40	3.15	2.89	3.37	3.79	3.12	2.86	3.01	2.71	2.98	2.85	2.42	0.0	1.5
33.0	3.70	2.75	3.18	2.68	2.98	3.11	3.17	3.41	3.02	3.02	2.82	3.65	3.70	3.34	2.93	2.94	2.68	68.4	1.5
37.0	7.93	6.87	6.91	5.04	6.28	6.78	5.26	6.13	6.11	7.06	6.21	7.26	6.69	8.16	7.97	11.71	5.04	68.4	1.5
40.0	2.79	2.77	2.73	2.88	3.50	3.31	3.37	3.25	2.99	3.19	3.40	3.19	3.97	3.17	2.85	2.90	2.73	46.8	1.5
42.0	2.55	2.47	2.52	2.64	2.85	3.06	3.16	2.99	2.75	2.95	3.06	2.96	3.20	2.98	2.51	2.53	2.47	21.6	1.5
45.0	2.61	2.40	2.51	2.56	2.84	3.26	3.04	3.14	2.71	3.22	3.08	2.92	3.19	2.98	2.57	2.81	2.40	21.6	1.5
48.0	3.66	3.08	4.15	4.48	4.05	3.80	4.04	5.64	3.92	4.28	5.27	3.96	4.81	4.92	4.52	3.81	3.08	21.6	1.5
53.0	4.92	3.71	4.59	4.12	4.16	4.41	5.26	13.65	4.58	5.20	4.90	5.64	4.26	4.39	4.00	4.41	3.71	21.6	1.5

SEGMENT MINIMUM = 2.27 AT THE 18.5 INCH STATION

A

TABLE 11
RSRM-7A AFT DOME INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MEDIAN	MAX.	DESIGN M+3S
9.3	1.157	1.242	1.323	1.319	1.481	1.420	1.102	0.999	0.983	0.577	0.971	1.054	1.140	1.090	1.011	1.050	1.096	1.481	2.560
10.7	1.448	1.378	1.396	1.541	1.770	1.775	1.412	0.799	1.032	1.141	1.030	1.129	1.346	1.239	1.164	1.155	1.292	1.775	2.261
12.0	1.393	1.347	1.579	1.558	1.701	1.718	1.582	1.166	1.283	1.296	1.161	1.271	1.394	1.342	1.357	1.300	1.352	1.718	2.208
13.1	1.476	1.394	1.718	1.625	1.712	1.684	1.583	1.163	1.386	1.387	1.216	1.418	1.434	1.362	1.434	1.427	1.430	1.718	2.218
14.4	1.457	1.437	1.751	1.565	1.657	1.639	1.529	1.120	1.390	1.300	1.153	1.436	1.483	1.297	1.395	1.445	1.441	1.751	2.225
16.0	1.584	1.424	1.722	1.517	1.534	1.760	1.506	1.163	1.312	1.329	1.149	1.355	1.607	1.421	1.362	1.433	1.429	1.760	1.980
17.3	1.620	1.401	1.674	1.476	1.402	1.802	<1.440	1.151	1.240	1.348	1.198	1.417	1.613	1.322	1.366	1.438	1.409	1.802	1.675
18.5	1.566	<1.291	1.519	<1.405	1.226	1.749	<1.353	1.057	1.134	1.217	1.132	1.435	1.623	<1.285	1.328	1.334	1.331	1.749	1.496
19.5	1.483	1.081	1.317	1.207	1.077	1.644	<1.232	1.047	0.982	1.013	1.012	1.328	1.434	1.139	1.214	1.141	1.174	1.644	1.617
21.3	1.263	1.000	1.126	1.128	1.003	1.338	1.065	1.083	0.956	0.941	0.975	1.130	1.183	1.030	0.947	1.075	1.070	1.338	1.654
24.3	1.445	1.247	1.271	1.244	1.225	1.027	1.103	1.197	1.035	0.921	1.134	1.243	1.193	1.312	1.193	1.244	1.211	1.445	1.832
33.0	0.955	1.310	1.170	1.339	1.205	1.154	1.145	1.048	1.183	1.168	1.274	0.977	0.969	1.086	1.223	1.228	1.169	1.339	1.399
37.0	0.374	0.420	0.422	0.597	0.480	0.439	0.575	0.490	0.502	0.414	0.471	0.416	0.466	0.364	0.373	0.248	0.431	0.597	1.356
40.0	1.016	0.995	1.027	0.988	0.814	0.849	0.871	0.896	0.965	0.902	0.829	0.902	0.734	0.901	0.992	0.958	0.902	1.027	1.324
42.0	1.123	1.127	1.126	1.086	1.002	0.915	0.941	0.974	1.056	0.968	0.939	0.978	0.920	0.935	1.126	1.124	0.990	1.127	1.311
45.0	1.091	1.166	1.115	1.112	1.025	0.859	0.963	0.932	1.093	0.884	0.920	0.998	0.931	0.937	1.088	0.999	0.999	1.166	1.222
48.0	0.825	0.945	0.732	0.679	0.781	0.797	0.769	0.528	0.758	0.698	0.556	0.784	0.659	0.607	0.650	0.785	0.745	0.945	1.155
53.0	0.750	0.980	0.808	0.889	0.881	0.832	0.697	0.266	0.788	0.697	0.759	0.653	0.906	0.825	0.904	0.842	0.817	0.980	1.305

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	AVE.	EXPOSURE TIME
9.3	9.4	10.1	10.8	10.7	12.1	11.6	9.0	8.1	8.0	4.7	7.9	8.6	9.3	8.9	8.2	8.6	9.1	122.8
10.7	12.0	11.4	11.6	12.8	14.7	14.7	11.7	6.6	8.6	9.5	8.5	9.4	11.2	10.3	9.7	9.6	10.8	120.6
12.0	11.8	11.5	13.4	13.2	14.5	14.6	13.5	9.9	10.9	11.0	9.9	10.8	11.9	11.4	11.5	11.1	11.9	117.6
13.1	12.9	12.1	15.0	14.2	14.9	14.7	13.8	10.1	12.1	12.1	10.6	12.4	12.5	11.9	12.5	12.4	12.7	114.8
14.4	12.9	12.7	15.5	13.9	14.7	14.5	13.5	9.9	12.3	11.5	10.2	12.7	13.1	11.5	12.3	12.8	12.8	113.0
16.0	14.6	13.1	15.8	13.9	14.1	16.2	13.8	10.7	12.1	12.2	10.6	12.5	14.8	13.1	12.5	13.2	13.3	108.8
17.3	15.3	13.2	15.8	13.9	13.2	17.0	13.6	10.9	11.7	12.7	11.3	13.4	15.2	12.5	12.9	13.6	13.5	105.9
18.5	15.1	12.4	14.6	13.5	11.8	16.9	13.0	10.2	10.9	11.7	10.9	13.8	15.7	12.4	12.8	12.9	13.1	103.7
19.5	14.6	10.6	12.9	11.9	10.6	16.2	12.1	10.3	9.7	10.0	10.0	13.1	14.1	11.2	11.9	11.2	11.9	101.7
21.3	12.8	10.2	11.5	11.5	10.2	13.6	10.8	11.0	9.7	9.6	9.9	11.5	12.0	10.5	9.6	10.9	11.0	98.3
24.3	15.3	13.2	13.5	13.2	13.0	10.9	11.7	12.7	11.0	9.8	12.0	13.2	12.7	13.9	12.7	13.2	12.6	94.3
33.0	11.4	15.6	13.9	16.0	14.4	13.8	13.6	12.5	14.1	13.9	15.2	11.6	11.5	12.9	14.6	14.6	13.7	83.9
37.0	4.7	5.3	5.3	7.5	6.0	5.5	7.2	6.2	6.3	5.2	5.9	5.2	5.9	4.6	4.7	3.1	5.5	79.5
40.0	13.1	12.8	13.2	12.7	10.5	10.9	11.2	11.5	12.4	11.6	10.7	11.6	9.4	11.6	12.8	12.3	11.8	77.7
42.0	14.6	14.7	14.7	14.2	13.1	11.9	12.3	12.7	13.8	12.6	12.2	12.8	12.0	12.2	14.7	14.7	13.3	76.7
45.0	14.5	15.5	14.8	14.8	13.6	11.4	12.8	12.4	14.5	11.7	12.2	13.3	12.4	12.4	14.4	13.3	13.4	75.3
48.0	11.5	13.2	10.2	9.5	10.9	11.1	10.8	7.4	10.6	9.8	7.8	11.0	9.2	8.5	9.1	11.0	10.1	71.5
53.0	10.0	13.0	10.8	11.8	11.7	11.1	9.3	3.5	10.5	9.3	10.1	8.7	12.1	11.0	12.0	11.2	10.4	75.1

MOTOR ACTION TIME = 123.4 SECONDS

TABLE 11
RSRM-7A AFT DOME INSULATION PERFORMANCE

PART NO. 1U76668-03
SERIAL NO. 0000004

PREFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN	MDT
9.3	5.173	5.295	5.396	5.394	5.341	5.347	5.299	5.348	5.338	5.346	5.288	5.300	5.290	5.256	5.232	5.168	5.168	5.299	4.900
10.7	5.161	5.145	5.234	5.202	5.193	5.200	5.139	5.218	5.175	5.115	5.127	5.115	5.125	5.173	5.205	5.140	5.115	5.167	4.700
12.0	5.032	4.976	5.091	5.049	5.001	5.032	4.971	5.049	4.998	4.949	4.947	4.965	4.964	4.999	5.041	5.034	4.947	5.000	4.500
13.1	4.812	4.756	4.871	4.818	4.783	4.801	4.743	5.115	4.765	4.749	4.766	4.758	4.808	4.764	4.840	4.831	4.743	4.792	4.300
14.4	4.474	4.403	4.531	4.491	4.444	4.482	4.394	4.478	4.441	4.409	4.443	4.424	4.454	4.470	4.540	4.471	4.394	4.462	4.100
16.0	4.212	4.144	4.252	4.201	4.172	4.203	4.132	4.186	4.162	4.154	4.202	4.170	4.222	4.218	4.266	4.183	4.132	4.194	3.780
17.3	4.070	4.022	4.145	4.082	4.046	4.096	4.026	4.076	4.047	4.032	4.108	4.067	4.113	4.088	4.153	4.058	4.022	4.073	3.560
18.5	3.902	3.875	3.972	3.912	3.868	3.968	3.888	3.902	3.928	3.880	3.960	3.698	3.951	3.934	4.013	3.908	3.698	3.910	3.360
19.5	3.755	3.716	3.814	3.761	3.703	3.804	3.739	3.750	3.769	3.723	3.836	3.807	3.815	3.789	3.864	3.753	3.703	3.765	3.150
21.3	3.535	3.520	3.648	3.538	3.523	3.605	3.544	3.538	3.545	3.514	3.625	3.643	3.627	3.579	3.658	3.534	3.514	3.545	2.940
24.3	3.497	3.484	3.572	3.483	3.542	3.495	3.477	3.458	3.492	3.494	3.541	3.558	3.594	3.562	3.555	3.547	3.458	3.519	2.940
33.0	3.537	3.608	3.722	3.584	3.595	3.589	3.631	3.571	3.574	3.533	3.592	3.563	3.582	3.627	3.580	3.615	3.533	3.587	3.200
37.0	2.966	2.886	2.917	3.008	3.016	2.978	3.027	3.002	3.069	2.922	2.927	3.021	3.118	2.972	2.973	2.903	2.886	2.976	2.600
40.0	2.831	2.752	2.806	2.848	2.848	2.811	2.933	2.913	2.888	2.874	2.819	2.878	2.914	2.853	2.832	2.780	2.752	2.848	2.600
42.0	2.869	2.788	2.835	2.864	2.856	2.802	2.975	2.910	2.907	2.851	2.873	2.899	2.947	2.783	2.823	2.849	2.783	2.860	2.600
45.0	2.844	2.794	2.799	2.843	2.907	2.800	2.931	2.924	2.957	2.845	2.831	2.913	2.972	2.793	2.796	2.810	2.793	2.844	2.600
48.0	3.019	2.910	3.037	3.045	3.162	3.026	3.103	2.976	2.972	2.985	2.931	3.105	3.168	2.985	2.938	2.990	2.910	3.005	2.600
53.0	3.693	3.634	3.707	3.660	3.662	3.667	3.667	3.630	3.609	3.627	3.719	3.684	3.862	3.619	3.619	3.710	3.609	3.664	3.380

PART NO. 1U76657-01
SERIAL NO. 0000002

POSTFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN
9.3	4.016	4.053	4.073	4.075	3.860	3.927	4.197	4.349	4.355	4.769	4.317	4.246	4.150	4.166	4.221	4.118	3.860	4.158
10.7	3.713	3.767	3.838	3.661	3.423	3.425	3.727	4.419	4.143	3.974	4.097	3.986	3.779	3.934	4.041	3.985	3.423	3.886
12.0	3.639	3.629	3.512	3.491	3.300	3.314	3.389	3.883	3.715	3.653	3.786	3.694	3.570	3.657	3.684	3.734	3.300	3.646
13.1	3.336	3.362	3.153	3.193	3.071	3.117	3.160	3.952	3.379	3.362	3.550	3.340	3.374	3.402	3.406	3.404	3.071	3.362
14.4	3.017	2.966	2.780	2.925	2.787	2.843	2.865	3.358	3.051	3.109	3.290	2.988	2.971	3.173	3.145	3.026	2.780	3.003
16.0	2.628	2.720	2.530	2.684	2.638	2.443	2.626	3.023	2.850	2.825	3.053	2.815	2.615	2.797	2.904	2.750	2.443	2.735
17.3	2.450	2.621	2.471	2.606	2.644	2.294	2.586	2.925	2.807	2.684	2.910	2.650	2.500	2.766	2.787	2.620	2.294	2.633
18.5	2.336	2.584	2.453	2.507	2.642	2.219	2.535	2.845	2.794	2.663	2.828	2.263	2.328	2.649	2.685	2.574	2.219	2.579
19.5	2.272	2.635	2.497	2.554	2.626	2.160	2.507	2.703	2.787	2.710	2.824	2.479	2.381	2.650	2.650	2.612	2.160	2.619
21.3	2.272	2.520	2.522	2.410	2.520	2.267	2.479	2.455	2.589	2.573	2.650	2.513	2.444	2.549	2.711	2.459	2.267	2.516
24.3	2.052	2.237	2.301	2.239	2.317	2.468	2.374	2.261	2.457	2.573	2.407	2.315	2.401	2.250	2.362	2.303	2.052	2.316
33.0	2.582	2.298	2.552	2.245	2.390	2.435	2.486	2.523	2.391	2.365	2.318	2.586	2.613	2.541	2.357	2.387	2.245	2.413
37.0	2.592	2.466	2.495	2.411	2.536	2.539	2.452	2.512	2.567	2.508	2.456	2.605	2.652	2.608	2.600	2.655	2.411	2.538
40.0	1.815	1.757	1.779	1.860	2.034	1.962	2.062	2.017	1.923	1.972	1.990	1.976	2.180	1.952	1.840	1.822	1.757	1.957
42.0	1.746	1.661	1.709	1.778	1.854	1.887	2.034	1.936	1.851	1.883	1.934	1.921	2.027	1.848	1.697	1.725	1.661	1.852
45.0	1.753	1.628	1.684	1.731	1.882	1.941	1.968	1.992	1.864	1.961	1.911	1.915	2.041	1.856	1.708	1.811	1.628	1.873
48.0	2.194	1.965	2.305	2.366	2.381	2.229	2.334	2.448	2.214	2.287	2.375	2.321	2.509	2.378	2.288	2.205	1.965	2.313
53.0	2.943	2.654	2.899	2.771	2.781	2.835	2.970	3.364	2.821	2.930	2.960	3.031	2.956	2.794	2.715	2.868	2.654	2.884

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
56.0	3.74	3.47	3.83	3.90	3.87	3.72	4.17	+	4.33	4.03	4.20	4.41	3.90	4.52	3.99	3.33	3.33	338.4	2.0
72.0	3.89	5.25	4.83	4.12	4.30	4.14	4.96	9.76	4.69	4.43	4.77	4.12	7.38	4.64	4.32	4.11	3.89	0.0	1.5
75.0	3.33	4.92	4.75	3.92	4.11	3.90	4.43	12.00	4.74	3.89	4.25	3.73	8.74	5.75	3.84	3.98	3.33	0.0	1.5
78.0	3.52	4.65	5.50	3.49	4.24	3.53	4.88	7.77	4.02	3.89	4.09	4.00	6.78	3.47	4.06	4.27	3.47	291.6	1.5
81.0	3.53	4.88	6.51	3.89	4.00	3.60	4.33	6.06	3.90	4.03	4.53	3.41	6.22	3.66	4.01	4.20	3.41	248.4	1.5
85.0	3.03	4.10	4.81	3.40	3.43	3.36	4.44	3.64	3.16	3.25	3.43	3.50	4.59	3.57	3.50	5.33	3.03	0.0	1.5
90.0	2.77	2.82	3.46	3.17	2.80	2.88	3.42	3.51	3.36	2.98	2.98	3.57	2.91	2.94	3.07	3.37	2.77	0.0	1.5
98.0	2.34	2.68	3.02	4.33	2.78	2.81	3.35	2.98	2.72	3.21	2.80	4.04	2.62	2.97	2.68	2.56	2.34	0.0	1.5
105.8	2.83		2.51		2.69		2.83		2.91		2.78		2.66		2.54		2.51	46.8	1.5
116.0	2.73		2.66		2.88		2.87		3.03		3.03		2.78		2.67		2.66	46.8	1.5
124.5	2.46		2.47		2.70		2.75		2.85		2.64		2.77		2.65		2.46	0.0	1.5
133.0	2.62		2.48		2.60		2.75		2.87		2.75		2.51		2.46		2.46	316.8	1.5
145.5	2.32		2.36		2.37		2.53		2.45		2.42		2.43		2.22		2.22	316.8	1.5
158.5	2.30		2.42		2.30		2.59		2.33		2.40		2.54		2.24		2.24	316.8	1.5
168.3	2.76		2.59		2.68		3.18		2.74		2.80		2.80		2.78		2.59	46.8	1.5
177.7	2.90		2.54		6.25		4.03		2.97		2.99		3.01		2.87		2.54	46.8	2.0
192.5	2.83		2.62		2.36		3.45		4.46		2.62		2.95		2.56		2.36	90.0	1.5
202.5	2.79		7.78		2.94		2.68		3.53		2.83		3.19		2.63		2.63	316.8	1.5
214.0	2.57		2.60		2.60		2.67		2.73		2.64		2.89		2.50		2.50	316.8	1.5
227.3	3.05		2.54		2.28		2.60		3.87		2.80		4.01		2.91		2.28	90.0	1.5
238.3	2.78		2.93		2.65		3.60		7.16		2.79		6.56		2.93		2.65	90.0	1.5
250.0	2.85		2.61		2.70		3.79		4.37		2.85		4.78		2.44		2.44	316.8	1.5
267.0	2.66		2.89		3.11		3.36		2.86		2.38		3.01		2.49		2.38	226.8	1.5
283.9	2.68		2.94		2.32		4.13		2.76		2.73		3.36		2.38		2.32	90.0	1.5
299.1	5.98		2.99		10.40		5.88		7.95		5.45		4.20		4.20		2.99	46.8	2.0
322.0	3.92		3.69		2.88		3.76		4.94		4.18		3.55		3.52		2.88	90.0	1.5
339.0	3.49		4.00		3.22		5.67		4.42		4.52		3.92		13.57		3.22	90.0	1.5
344.0	3.14		2.88		2.57		3.73		3.25		2.59		3.09		6.79		2.57	90.0	1.5
358.0	9.27		9.05		11.87		7.45		10.27		9.74		7.76		6.67		6.67	316.8	1.5
363.0	4.94		8.44		5.51		7.60		5.14		4.94		5.07		4.75		4.75	316.8	1.5
367.0	13.10		5.94		7.60		5.67		95.00		7.92		31.67		10.56		5.67	136.8	1.5
372.0	6.06		5.71		7.55		5.80		8.16		12.12		6.90		6.67		5.71	46.8	1.5
375.0	13.71		15.48		12.97		9.06		+		13.33		16.00		+		9.06	136.8	1.5
377.5	+		66.25		+		+		+		+		+		14.72		14.72	316.8	1.5

SEGMENT MINIMUM = 2.22 AT THE 145.5 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

A

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
56.0	4.62	4.14	4.57	4.66	4.65	4.50	5.08	+	5.19	4.90	4.99	5.26	4.90	5.37	4.75	4.12	4.12	338.4	2.0
72.0	4.17	5.65	5.28	4.33	4.47	4.32	5.32	10.50	5.04	4.73	5.06	4.41	7.95	4.96	4.55	4.42	4.17	0.0	1.5
75.0	3.68	5.39	5.07	4.22	4.33	4.18	4.83	12.69	5.06	4.25	4.63	4.11	9.50	6.12	4.17	4.33	3.68	0.0	1.5
78.0	3.76	5.04	5.74	3.85	4.38	3.79	5.25	8.01	4.30	4.14	4.33	4.24	7.41	3.65	4.27	4.50	3.65	291.6	1.5
81.0	3.75	5.19	6.80	4.09	4.19	3.82	4.75	6.34	4.28	4.37	4.74	3.71	6.57	3.84	4.24	4.52	3.71	248.4	1.5
85.0	3.77	5.01	5.64	4.24	4.18	4.09	5.44	4.48	3.95	4.09	4.27	4.34	5.58	4.24	4.30	6.43	3.77	0.0	1.5
90.0	3.33	3.34	4.16	3.87	3.36	3.43	4.04	4.06	3.99	3.58	3.51	4.42	3.53	3.49	3.77	4.17	3.33	0.0	1.5
98.0	3.00	3.36	3.72	5.37	3.45	3.45	4.09	3.73	3.43	4.01	3.48	4.88	3.27	3.67	3.39	3.26	3.00	0.0	1.5
105.8	2.88		2.52		2.78		2.86		3.02		2.84		2.75		2.58		2.52	46.8	1.5
116.0	2.80		2.68		2.88		2.87		3.11		3.04		2.85		2.69		2.68	46.8	1.5
124.5	2.50		2.50		2.71		2.76		2.93		2.74		2.86		2.70		2.50	0.0	1.5
133.0	3.02		2.88		3.03		3.10		3.15		3.13		2.92		2.86		2.86	316.8	1.5
145.5	2.30		2.33		2.31		2.48		2.43		2.40		2.41		2.19		2.19	316.8	1.5
158.5	2.35		2.44		2.34		2.63		2.38		2.45		2.59		2.26		2.26	316.8	1.5
168.3	3.47		3.25		3.20		3.85		3.38		3.55		3.50		3.54		3.20	90.0	1.5
177.7	4.29		3.82		9.43		6.09		4.46		4.46		4.57		4.30		3.82	46.8	2.0
192.5	3.33		3.01		2.74		3.74		5.13		3.03		3.47		2.98		2.74	90.0	1.5
202.5	2.82		2.80		2.97		2.71		3.56		2.83		3.19		2.67		2.67	316.8	1.5
214.0	2.61		2.67		2.68		2.68		2.82		2.75		2.95		2.56		2.56	316.8	1.5
227.3	3.42		2.71		2.59		2.83		4.04		3.16		4.56		3.19		2.59	90.0	1.5
238.3	2.83		2.94		2.68		3.92		7.18		2.88		6.60		2.97		2.68	90.0	1.5
250.0	2.82		2.59		2.67		3.79		4.35		2.82		4.72		2.43		2.43	316.8	1.5
267.0	2.84		3.06		3.19		3.66		3.07		2.72		3.12		2.70		2.70	316.8	1.5
283.9	2.86		3.07		2.47		4.46		2.98		2.95		3.46		2.59		2.47	90.0	1.5
299.1	9.05		4.54		16.48		9.07		12.05		8.24		6.69		6.37		4.54	46.8	2.0
322.0	4.32		4.11		3.15		4.12		5.42		4.62		3.95		3.88		3.15	90.0	1.5
339.0	3.74		4.35		3.52		6.06		4.80		4.82		4.27		14.57		3.52	90.0	1.5
344.0	4.26		3.81		3.70		4.86		4.34		3.52		4.27		9.93		3.52	226.8	1.5
358.0	10.10		9.93		12.59		8.00		11.19		10.51		8.39		7.18		7.18	316.8	1.5
363.0	6.64		11.07		7.51		10.00		7.19		7.00		6.73		6.38		6.38	316.8	1.5
367.0	15.41		6.78		8.58		6.28		+		8.75		35.50		11.81		6.28	136.8	1.5
372.0	6.50		6.03		7.92		6.26		8.61		12.76		7.29		6.97		6.03	46.8	1.5
375.0	15.23		16.71		14.24		10.13		+		15.33		17.37		+		10.13	136.8	1.5
377.5	+		+		+		+		+		+		+		24.53		24.53	316.8	1.5

SEGMENT MINIMUM = 2.19 AT THE 145.5 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

A

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MEDIAN	MAX.	DESIGN M+3S
56.0	0.746	0.805	0.728	0.716	0.721	0.750	0.669	0	0.644	0.692	0.664	0.633	0.715	0.617	0.700	0.838	0.707	0.838	1.369
72.0	0.514	0.381	0.414	0.486	0.465	0.483	0.403	0.205	0.426	0.451	0.419	0.485	0.271	0.431	0.463	0.487	0.441	0.514	0.817
75.0	0.541	0.366	0.379	0.459	0.438	0.461	0.406	0.150	0.380	0.463	0.424	0.482	0.206	0.313	0.469	0.452	0.431	0.541	0.773
78.0	0.455	0.344	0.291	0.459	0.377	0.453	0.328	0.206	0.398	0.411	0.391	0.400	0.236	0.461	0.394	0.375	0.393	0.461	0.718
81.0	0.397	0.287	0.215	0.360	0.350	0.389	0.323	0.231	0.359	0.347	0.309	0.410	0.225	0.382	0.349	0.333	0.348	0.410	0.688
85.0	0.429	0.317	0.270	0.382	0.379	0.387	0.293	0.357	0.412	0.400	0.379	0.371	0.283	0.364	0.371	0.244	0.371	0.429	0.618
90.0	0.456	0.449	0.366	0.399	0.451	0.440	0.370	0.360	0.377	0.424	0.424	0.354	0.434	0.430	0.412	0.375	0.418	0.456	0.576
98.0	0.486	0.424	0.376	0.262	0.409	0.404	0.339	0.381	0.418	0.354	0.406	0.281	0.433	0.382	0.424	0.444	0.405	0.486	0.582
105.8	0.381		0.431		0.401		0.381		0.371		0.388		0.406		0.426		0.395	0.431	0.559
116.0	0.384		0.395		0.365		0.366		0.346		0.346		0.378		0.393		0.372	0.395	0.527
124.5	0.419		0.417		0.382		0.375		0.362		0.390		0.372		0.388		0.385	0.419	0.522
133.0	0.374		0.395		0.377		0.357		0.342		0.357		0.391		0.398		0.375	0.398	0.516
145.5	0.400		0.394		0.393		0.368		0.380		0.385		0.383		0.419		0.389	0.419	0.493
158.5	0.383		0.363		0.382		0.340		0.377		0.367		0.346		0.393		0.372	0.393	0.491
168.3	0.308		0.328		0.317		0.267		0.310		0.304		0.304		0.306		0.307	0.328	0.459
177.7	0.345		0.394		0.160		0.248		0.337		0.335		0.332		0.348		0.336	0.394	0.452
192.5	0.276		0.298		0.330		0.226		0.175		0.298		0.264		0.305		0.287	0.330	0.400
202.5	0.262		0.263		0.248		0.272		0.207		0.258		0.229		0.278		0.260	0.278	0.376
214.0	0.272		0.269		0.269		0.262		0.256		0.265		0.242		0.280		0.267	0.280	0.351
227.3	0.213		0.256		0.285		0.250		0.168		0.232		0.162		0.223		0.228	0.285	0.317
238.3	0.227		0.215		0.238		0.175		0.088		0.226		0.096		0.215		0.215	0.238	0.331
250.0	0.193		0.211		0.204		0.145		0.126		0.193		0.115		0.225		0.193	0.225	0.285
267.0	0.188		0.173		0.161		0.149		0.175		0.210		0.166		0.201		0.174	0.210	0.303
283.9	0.168		0.153		0.194		0.109		0.163		0.165		0.134		0.189		0.164	0.194	0.251
299.1	0.113		0.226		0.065		0.115		0.085		0.124		0.161		0.161		0.119	0.226	0.253
322.0	0.097		0.103		0.132		0.101		0.077		0.091		0.107		0.108		0.102	0.132	0.197
339.0	0.109		0.095		0.118		0.067		0.086		0.084		0.097		0.028		0.090	0.118	0.190
344.0	0.121		0.132		0.148		0.102		0.117		0.147		0.123		0.056		0.122	0.148	0.187
358.0	0.041		0.042		0.032		0.051		0.037		0.039		0.049		0.057		0.042	0.057	0.181
363.0	0.077		0.045		0.069		0.050		0.074		0.077		0.075		0.080		0.074	0.080	0.179
367.0	0.029		0.064		0.050		0.067		0.004		0.048		0.012		0.036		0.042	0.067	0.175
372.0	0.066		0.070		0.053		0.069		0.049		0.033		0.058		0.060		0.059	0.070	0.226
375.0	0.035		0.031		0.037		0.053		0.004		0.036		0.030		0.003		0.033	0.053	0.237
377.5	0		0.008		0		0		0		0		0		0.036		0	0.036	0.237

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	AVE.	EXPOSURE TIME
56.0	10.0	10.8	9.7	9.6	9.7	10.0	9.0	0	8.6	9.3	8.9	8.5	9.6	8.3	9.4	11.2	8.9	74.7
72.0	9.1	6.7	7.3	8.6	8.2	8.5	7.1	3.6	7.5	8.0	7.4	8.6	4.8	7.6	8.2	8.6	7.5	56.7
75.0	10.6	7.2	7.4	9.0	8.6	9.1	8.0	2.9	7.5	9.1	8.3	9.5	4.0	6.1	9.2	8.9	7.8	50.9
78.0	9.7	7.4	6.2	9.8	8.1	9.7	7.0	4.4	8.5	8.8	8.4	8.6	5.1	9.9	8.4	8.0	8.0	46.7
81.0	8.6	6.3	4.7	7.8	7.6	8.5	7.0	5.0	7.8	7.6	6.7	8.9	4.9	8.3	7.6	7.3	7.2	45.9
85.0	9.5	7.0	6.0	8.4	8.4	8.5	6.5	7.9	9.1	8.8	8.4	8.2	6.2	8.0	8.2	5.4	7.8	45.3
90.0	10.2	10.0	8.2	8.9	10.1	9.8	8.3	8.1	8.4	9.5	9.5	7.9	9.7	9.6	9.2	8.4	9.1	44.7
98.0	11.1	9.7	8.6	6.0	9.4	9.2	7.8	8.7	9.6	8.1	9.3	6.4	9.9	8.7	9.7	10.2	8.9	43.7
105.8	8.9		10.0		9.3		8.9		8.6		9.0		9.5		9.9		9.3	42.9
116.0	9.1		9.4		8.7		8.7		8.2		8.2		9.0		9.3		8.8	42.1
124.5	10.2		10.1		9.3		9.1		8.8		9.5		9.1		9.4		9.4	41.1
133.0	9.4		9.9		9.4		8.9		8.6		8.9		9.8		10.0		9.4	39.9
145.5	10.6		10.4		10.4		9.7		10.0		10.2		10.1		11.1		10.3	37.9
158.5	10.6		10.0		10.5		9.4		10.4		10.1		9.5		10.8		10.2	36.3
168.3	8.8		9.4		9.1		7.7		8.9		8.7		8.7		8.8		8.8	34.9
177.7	10.0		11.4		4.6		7.2		9.8		9.7		9.6		10.1		9.1	34.5
192.5	8.8		9.5		10.5		7.2		5.6		9.5		8.4		9.7		8.7	31.3
202.5	8.8		8.8		8.3		9.1		6.9		8.7		7.7		9.3		8.5	29.8
214.0	9.7		9.6		9.6		9.4		9.1		9.5		8.6		10.0		9.4	28.0
227.3	8.2		9.8		11.0		9.6		6.5		8.9		6.2		8.6		8.6	26.0
238.3	9.3		8.8		9.8		7.2		3.6		9.3		3.9		8.8		7.6	24.4
250.0	8.6		9.4		9.1		6.5		5.6		8.6		5.1		10.0		7.9	22.4
267.0	9.5		8.7		8.1		7.5		8.8		10.6		8.4		10.2		9.0	19.8
283.9	9.9		9.0		11.4		6.4		9.6		9.7		7.9		11.1		9.4	17.0
299.1	6.4		12.8		3.7		6.5		4.8		7.0		9.1		9.1		7.5	17.6
322.0	7.6		8.0		10.3		7.9		6.0		7.1		8.4		8.4		8.0	12.8
339.0	8.9		7.8		9.7		5.5		7.0		6.9		8.0		2.3		7.0	12.2
344.0	9.9		10.8		12.1		8.4		9.6		12.0		10.1		4.6		9.7	12.2
358.0	3.6		3.7		2.8		4.5		3.2		3.4		4.3		5.0		3.8	11.4
363.0	6.8		3.9		6.1		4.4		6.5		6.8		6.6		7.0		6.0	11.4
367.0	2.6		5.8		4.5		6.1		0.4		4.4		1.1		3.3		3.5	11.0
372.0	4.2		4.4		3.4		4.4		3.1		2.1		3.7		3.8		3.6	15.8
375.0	1.8		1.6		1.9		2.8		0.2		1.9		1.6		0.2		1.5	19.2
377.5	0		0.4		0		0		0		0		0		1.8		0.3	20.4

MOTOR ACTION TIME = 123.4 SECONDS

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

PART NO. 1U76668-03
SERIAL NO. 0000004

PREFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN	MDT
56.0	3.449	3.331	3.325	3.335	3.352	3.372	3.401	3.319	3.340	3.393	3.316	3.329	3.502	3.316	3.327	3.452	3.316	3.338	2.790
72.0	2.141	2.154	2.187	2.106	2.078	2.087	2.144	2.153	2.149	2.132	2.121	2.141	2.155	2.138	2.106	2.154	2.078	2.141	2.000
75.0	1.990	1.974	1.922	1.939	1.895	1.926	1.959	1.903	1.924	1.969	1.962	1.979	1.956	1.917	1.957	1.959	1.895	1.957	1.800
78.0	1.712	1.733	1.670	1.765	1.652	1.716	1.723	1.651	1.713	1.700	1.694	1.694	1.749	1.682	1.682	1.688	1.651	1.697	1.600
81.0	1.487	1.490	1.461	1.472	1.468	1.487	1.534	1.465	1.537	1.515	1.464	1.521	1.478	1.468	1.480	1.505	1.461	1.484	1.400
85.0	1.618	1.588	1.524	1.619	1.584	1.584	1.594	1.600	1.627	1.634	1.620	1.609	1.579	1.543	1.594	1.570	1.524	1.594	1.300
90.0	1.519	1.498	1.524	1.543	1.517	1.507	1.495	1.460	1.503	1.520	1.490	1.563	1.531	1.500	1.553	1.563	1.460	1.518	1.265
98.0	1.460	1.423	1.399	1.407	1.410	1.394	1.385	1.420	1.432	1.421	1.413	1.372	1.418	1.403	1.436	1.446	1.372	1.416	1.135
105.8	1.096		1.088		1.113		1.089		1.121		1.100		1.118		1.100		1.088	1.100	1.080
116.0	1.076		1.058		1.050		1.050		1.075		1.053		1.079		1.056		1.050	1.057	1.050
124.5	1.046		1.044		1.035		1.035		1.061		1.067		1.063		1.048		1.035	1.047	1.030
133.0	1.129		1.139		1.143		1.105		1.078		1.116		1.140		1.140		1.078	1.134	0.980
145.5	0.919		0.917		0.907		0.913		0.925		0.925		0.924		0.917		0.907	0.918	0.930
158.5	0.901		0.887		0.892		0.894		0.897		0.899		0.897		0.890		0.887	0.896	0.880
168.3	1.069		1.067		1.015		1.029		1.048		1.079		1.064		1.084		1.015	1.066	0.850
177.7	1.480		1.504		1.509		1.510		1.503		1.493		1.516		1.495		1.480	1.503	1.000
192.5	0.919		0.897		0.904		0.846		0.897		0.904		0.917		0.910		0.846	0.904	0.780
202.5	0.739		0.736		0.737		0.738		0.736		0.731		0.731		0.741		0.731	0.737	0.730
214.0	0.710		0.717		0.720		0.703		0.722		0.730		0.715		0.718		0.703	0.718	0.700
227.3	0.729		0.695		0.737		0.707		0.678		0.732		0.739		0.712		0.678	0.720	0.650
238.3	0.642		0.632		0.637		0.686		0.632		0.651		0.634		0.638		0.632	0.638	0.630
250.0	0.545		0.546		0.545		0.549		0.548		0.545		0.543		0.546		0.543	0.546	0.550
267.0	0.533		0.529		0.513		0.546		0.537		0.572		0.518		0.542		0.513	0.535	0.500
283.9	0.480		0.470		0.480		0.486		0.486		0.486		0.463		0.489		0.463	0.483	0.450
299.1	1.023		1.027		1.071		1.043		1.024		1.022		1.077		1.025		1.022	1.026	0.676
322.0	0.419		0.423		0.416		0.416		0.417		0.420		0.423		0.419		0.416	0.419	0.380
339.0	0.408		0.413		0.415		0.406		0.413		0.405		0.414		0.408		0.405	0.410	0.380
344.0	0.515		0.503		0.548		0.496		0.508		0.517		0.525		0.556		0.496	0.516	0.380
358.0	0.414		0.417		0.403		0.408		0.414		0.410		0.411		0.409		0.403	0.411	0.380
363.0	0.511		0.498		0.518		0.500		0.532		0.539		0.505		0.510		0.498	0.511	0.380
367.0	0.447		0.434		0.429		0.421		0.418		0.420		0.426		0.425		0.418	0.426	0.380
372.0	0.429		0.422		0.420		0.432		0.422		0.421		0.423		0.418		0.418	0.422	0.400
375.0	0.533		0.518		0.527		0.537		0.543		0.552		0.521		0.545		0.518	0.535	0.480
377.5	0.778		0.888		0.780		0.858		0.780		0.801		0.792		0.883		0.778	0.797	0.530

A

TABLE 12
RSRM-7A AFT CYLINDER INSULATION PERFORMANCE

PART NO. 1U76657-01
SERIAL NO. 0000002

POSTFIRE MEASUREMENTS
INCHES

STATION	DEGREE LOCATIONS																	
(IN)	0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN
56.0	2.703	2.526	2.597	2.619	2.631	2.622	2.732	3.335	2.696	2.701	2.652	2.696	2.787	2.699	2.627	2.614	2.526	2.674
72.0	1.627	1.773	1.773	1.620	1.613	1.604	1.741	1.948	1.723	1.681	1.702	1.656	1.884	1.707	1.643	1.667	1.604	1.692
75.0	1.449	1.608	1.543	1.480	1.457	1.465	1.553	1.753	1.544	1.506	1.538	1.497	1.750	1.604	1.488	1.507	1.449	1.523
78.0	1.257	1.389	1.379	1.306	1.275	1.263	1.395	1.445	1.315	1.289	1.303	1.294	1.513	1.221	1.288	1.313	1.221	1.304
81.0	1.090	1.203	1.246	1.112	1.118	1.098	1.211	1.234	1.178	1.168	1.155	1.111	1.253	1.086	1.131	1.172	1.086	1.161
85.0	1.189	1.271	1.254	1.237	1.205	1.197	1.301	1.243	1.215	1.234	1.241	1.238	1.296	1.179	1.223	1.326	1.179	1.238
90.0	1.063	1.049	1.158	1.144	1.066	1.067	1.125	1.100	1.126	1.096	1.066	1.209	1.097	1.070	1.141	1.188	1.049	1.099
98.0	0.974	0.999	1.023	1.145	1.001	0.990	1.046	1.039	1.014	1.067	1.007	1.091	0.985	1.021	1.012	1.002	0.974	1.013
105.8	0.715		0.657		0.712		0.708		0.750		0.712		0.712		0.674		0.657	0.712
116.0	0.692		0.663		0.685		0.684		0.729		0.707		0.701		0.663		0.663	0.688
124.5	0.627		0.627		0.653		0.660		0.699		0.677		0.691		0.660		0.627	0.660
133.0	0.755		0.744		0.766		0.748		0.736		0.759		0.749		0.742		0.736	0.749
145.5	0.519		0.523		0.514		0.545		0.545		0.540		0.541		0.498		0.498	0.532
158.5	0.518		0.524		0.510		0.554		0.520		0.532		0.551		0.497		0.497	0.522
168.3	0.761		0.739		0.698		0.762		0.738		0.775		0.760		0.778		0.698	0.761
177.7	1.135		1.110		1.349		1.262		1.166		1.158		1.184		1.147		1.110	1.162
192.5	0.643		0.599		0.574		0.620		0.722		0.606		0.653		0.605		0.574	0.613
202.5	0.477		0.473		0.489		0.466		0.529		0.473		0.502		0.463		0.463	0.475
214.0	0.438		0.448		0.451		0.441		0.466		0.465		0.473		0.438		0.438	0.450
227.3	0.516		0.439		0.452		0.457		0.510		0.500		0.577		0.489		0.439	0.495
238.3	0.415		0.417		0.399		0.511		0.544		0.425		0.538		0.423		0.399	0.424
250.0	0.352		0.335		0.341		0.404		0.422		0.352		0.428		0.321		0.321	0.352
267.0	0.345		0.356		0.352		0.397		0.362		0.362		0.352		0.341		0.341	0.354
283.9	0.312		0.317		0.286		0.377		0.323		0.321		0.329		0.300		0.286	0.319
299.1	0.910		0.801		1.006		0.928		0.939		0.898		0.916		0.864		0.801	0.913
322.0	0.322		0.320		0.284		0.315		0.340		0.329		0.316		0.311		0.284	0.318
339.0	0.299		0.318		0.297		0.339		0.327		0.321		0.317		0.380		0.297	0.319
344.0	0.394		0.371		0.400		0.394		0.391		0.370		0.402		0.500		0.370	0.394
358.0	0.373		0.375		0.371		0.357		0.377		0.371		0.362		0.352		0.352	0.371
363.0	0.434		0.453		0.449		0.450		0.458		0.462		0.430		0.430		0.430	0.449
367.0	0.418		0.370		0.379		0.354		0.414		0.372		0.414		0.389		0.354	0.384
372.0	0.363		0.352		0.367		0.363		0.373		0.388		0.365		0.358		0.352	0.364
375.0	0.498		0.487		0.490		0.484		0.539		0.516		0.491		0.542		0.484	0.495
377.5	0.838		0.880		0.801		1.011		0.838		0.887		0.809		0.847		0.801	0.843

TABLE 13
RSRM-7A AFT CENTER SEGMENT INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION	DEGREE LOCATIONS										REQUIRED
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	S.F.
3.5	4.13	4.61	3.48	4.04	4.82	4.20	4.58	3.98	3.48	90.0	2.0
11.0	3.76	3.28	2.97	3.38	3.19	3.06	3.62	3.28	2.97	90.0	1.5
30.7	2.80	2.74	2.63	3.68	2.85	3.33	2.72	2.45	2.45	316.0	1.5
36.2	4.84	2.96	2.99	4.00	3.82	3.75	4.38	3.24	2.96	46.0	1.5
39.7	+	3.07	2.57	3.68	3.14	3.44	3.58	3.31	2.57	90.0	1.5
44.6	30.00	6.00	5.22	8.57	7.06	10.59	9.00	5.63	5.22	90.0	1.5
48.0	26.18	5.33	5.05	4.88	6.86	5.43	5.54	5.05	4.88	136.0	1.5
71.5	3.86	4.15	2.62	4.05	5.15	3.27	+	2.43	2.43	316.0	1.5
126.0	6.00	3.95	3.95	10.71	6.25	5.77	5.56	3.85	3.85	316.0	1.5
153.5	35.00	20.00	4.52	10.77	14.00	11.67	4.67	2.80	2.80	316.0	1.5
161.4	+	3.58	6.74	5.02	3.93	5.36	6.56	5.02	3.58	46.0	2.0
214.1	7.22	+	+	+	21.67	9.29	+	8.13	7.22	0.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 2.43 AT THE 71.5 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION	DEGREE LOCATIONS										REQUIRED
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	S.F.
3.5	5.13	5.98	4.41	4.98	5.90	5.30	5.66	4.87	4.41	90.0	2.0
11.0	4.73	4.25	4.07	4.39	4.17	4.02	4.63	4.15	4.02	226.0	1.5
30.7	3.04	2.90	2.87	4.11	3.03	3.54	2.91	2.60	2.60	316.0	1.5
36.2	6.51	3.90	4.04	5.56	5.13	4.98	5.90	4.27	3.90	46.0	1.5
39.7	+	4.66	3.96	5.73	4.95	5.22	5.59	4.82	3.96	90.0	1.5
44.6	30.25	6.07	5.43	9.12	7.33	10.91	9.28	5.66	5.43	90.0	1.5
48.0	33.91	6.78	6.44	6.47	8.98	6.96	7.19	6.46	6.44	90.0	1.5
71.5	4.41	4.78	3.00	4.67	5.85	3.85	+	2.84	2.84	316.0	1.5
126.0	6.16	4.08	4.16	11.50	6.63	6.15	6.00	4.05	4.05	316.0	1.5
153.5	40.00	22.43	5.13	12.54	15.80	13.25	5.33	3.20	3.20	316.0	1.5
161.4	+	9.70	18.43	13.53	10.48	13.91	17.03	12.66	9.70	46.0	2.0
214.1	7.61	+	+	+	23.67	10.00	+	8.69	7.61	0.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 2.60 AT THE 30.7 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 13
RSRM-7A AFT CENTER SEGMENT INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION	DEGREE LOCATIONS										DESIGN
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MEDIAN	MAX.	M+3S
3.5	0.513	0.460	0.609	0.525	0.440	0.505	0.463	0.533	0.509	0.609	1.067
11.0	0.505	0.580	0.640	0.562	0.595	0.621	0.525	0.579	0.580	0.640	0.829
30.7	0.268	0.274	0.285	0.204	0.263	0.225	0.276	0.306	0.271	0.306	0.484
36.2	0.124	0.203	0.201	0.150	0.157	0.160	0.137	0.185	0.158	0.203	0.318
39.7	0	0.140	0.167	0.117	0.137	0.125	0.120	0.130	0.127	0.167	0.205
44.6	0.012	0.060	0.069	0.042	0.051	0.034	0.040	0.064	0.046	0.069	0.090
48.0	0.011	0.054	0.057	0.059	0.042	0.053	0.052	0.057	0.053	0.059	0.089
71.5	0.044	0.041	0.065	0.042	0.033	0.052	0	0.070	0.043	0.070	0.086
126.0	0.025	0.038	0.038	0.014	0.024	0.026	0.027	0.039	0.026	0.039	0.074
153.5	0.004	0.007	0.031	0.013	0.010	0.012	0.030	0.050	0.012	0.050	0.059
161.4	0	0.066	0.035	0.047	0.060	0.044	0.036	0.047	0.045	0.066	0.082
214.1	0.018	0	0	0	0.006	0.014	0	0.016	0.003	0.018	0.029
280.0	0	0	0	0	0	0	0	0	0	0	0.005
298.0	0	0	0	0	0	0	0	0	0	0	0.005
307.8	0	0	0	0	0	0	0	0	0	0	0.003
311.8	0	0	0	0	0	0	0	0	0	0	0.003
314.0	0	0	0	0	0	0	0	0	0	0	0.003

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION	DEGREE LOCATIONS									EXPOSURE
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	AVE.	TIME
3.5	4.5	4.1	5.4	4.6	3.9	4.5	4.1	4.7	4.5	113.0
11.0	5.2	5.9	6.5	5.7	6.1	6.3	5.4	5.9	5.9	98.0
30.7	5.6	5.7	6.0	4.3	5.5	4.7	5.8	6.4	5.5	47.8
36.2	3.8	6.2	6.1	4.6	4.8	4.9	4.2	5.7	5.0	32.7
39.7	0	6.3	7.5	5.2	6.1	5.6	5.4	5.8	5.2	22.3
44.6	1.0	5.0	5.8	3.5	4.3	2.8	3.3	5.3	3.9	12.0
48.0	1.0	4.8	5.0	5.2	3.7	4.7	4.6	5.0	4.3	11.3
71.5	4.3	4.0	6.4	4.1	3.2	5.1	0	6.9	4.3	10.2
126.0	2.8	4.3	4.3	1.6	2.7	3.0	3.1	4.4	3.3	8.8
153.5	0.5	0.9	4.0	1.7	1.3	1.5	3.8	6.4	2.5	7.8
161.4	0	6.6	3.5	4.7	6.0	4.4	3.6	4.7	4.2	10.0
214.1	3.0	0	0	0	1.0	2.3	0	2.7	1.1	6.0
280.0	0	0	0	0	0	0	0	0	0	3.4
298.0	0	0	0	0	0	0	0	0	0	2.8
307.8	0	0	0	0	0	0	0	0	0	2.0
311.8	0	0	0	0	0	0	0	0	0	2.0
314.0	0	0	0	0	0	0	0	0	0	0.6

MOTOR ACTION TIME = 123.4 SECONDS

TABLE 13
RSRM-7A AFT CENTER SEGMENT INSULATION PERFORMANCE

PART NO. 1U76667-01 PREFIRE MEASUREMENTS
SERIAL NO. 0000005 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN	MDT
3.5	2.633	2.749	2.683	2.615	2.595	2.679	2.620	2.595	2.595	2.626	2.120
11.0	2.389	2.466	2.607	2.467	2.482	2.498	2.432	2.400	2.389	2.467	1.900
30.7	0.814	0.795	0.817	0.838	0.798	0.796	0.802	0.797	0.795	0.800	0.750
36.2	0.807	0.792	0.812	0.834	0.805	0.797	0.808	0.790	0.790	0.806	0.600
39.7	0.631	0.652	0.661	0.670	0.678	0.653	0.671	0.627	0.627	0.657	0.430
44.6	0.363	0.364	0.375	0.383	0.374	0.371	0.371	0.362	0.362	0.371	0.360
48.0	0.373	0.366	0.367	0.382	0.377	0.369	0.374	0.368	0.366	0.371	0.288
71.5	0.194	0.196	0.195	0.196	0.193	0.200	0.196	0.199	0.193	0.196	0.170
126.0	0.154	0.155	0.158	0.161	0.159	0.160	0.162	0.158	0.154	0.159	0.150
153.5	0.160	0.157	0.159	0.163	0.158	0.159	0.160	0.160	0.157	0.160	0.140
161.4	0.630	0.640	0.645	0.636	0.629	0.612	0.613	0.595	0.595	0.630	0.236
214.1	0.137	0.137	0.140	0.143	0.142	0.140	0.141	0.139	0.137	0.140	0.130
280.0	0.094	0.098	0.102	0.102	0.102	0.102	0.100	0.099	0.094	0.101	0.090
298.0	0.102	0.094	0.096	0.099	0.098	0.103	0.098	0.097	0.094	0.098	0.090
307.8	0.104	0.098	0.095	0.099	0.098	0.100	0.098	0.095	0.095	0.098	0.090
311.8	0.101	0.094	0.096	0.100	0.099	0.098	0.098	0.094	0.094	0.098	0.090
314.0	0.107	0.106	0.099	0.101	0.110	0.100	0.097	0.097	0.097	0.101	0.090

PART NO. 1U76652-03 POSTFIRE MEASUREMENTS
SERIAL NO. 0000003 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN
3.5	2.120	2.289	2.074	2.090	2.155	2.174	2.157	2.062	2.062	2.138
11.0	1.884	1.886	1.967	1.905	1.887	1.877	1.907	1.821	1.821	1.887
30.7	0.546	0.521	0.532	0.634	0.535	0.571	0.526	0.491	0.491	0.534
36.2	0.683	0.589	0.611	0.684	0.648	0.637	0.671	0.605	0.589	0.643
39.7	0.644	0.512	0.494	0.553	0.541	0.528	0.551	0.497	0.494	0.535
44.6	0.351	0.304	0.306	0.341	0.323	0.337	0.331	0.298	0.298	0.327
48.0	0.362	0.312	0.310	0.323	0.335	0.316	0.322	0.311	0.310	0.319
71.5	0.150	0.155	0.130	0.154	0.160	0.148	0.198	0.129	0.129	0.152
126.0	0.129	0.117	0.120	0.147	0.135	0.134	0.135	0.119	0.117	0.132
153.5	0.156	0.150	0.128	0.150	0.148	0.147	0.130	0.110	0.110	0.148
161.4	0.674	0.574	0.610	0.589	0.569	0.568	0.577	0.548	0.548	0.576
214.1	0.119	0.150	L	L	0.136	0.126	L	0.123	0.119	0.138
280.0	L	L	L	L	L	L	L	L	L	0.101
298.0	L	L	L	L	L	L	L	L	L	0.098
307.8	L	L	L	L	L	L	L	L	L	0.098
311.8	L	L	L	L	L	L	L	L	L	0.098
314.0	L	L	L	L	L	L	L	L	L	0.101

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 14
RSRM-7A FORWARD CENTER SEGMENT INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	26.50	26.50	33.13	10.34	17.97	12.54	11.04	10.82	10.34	136.0	2.0
11.0	6.69	4.95	4.99	6.11	6.81	5.07	6.29	27.94	4.95	46.0	1.5
30.7	6.47	8.52	14.42	9.62	11.36	6.70	5.73	7.08	5.73	270.0	1.5
36.2	6.74	7.79	11.54	12.77	10.71	6.45	6.52	6.82	6.45	226.0	1.5
39.7	3.55	4.39	6.14	3.52	4.78	4.39	3.52	2.81	2.81	316.0	1.5
44.6	13.33	11.61	+	45.00	18.00	20.00	7.35	14.40	7.35	270.0	1.5
48.0	7.58	12.00	32.00	18.00	+	15.16	6.86	9.00	6.86	270.0	1.5
71.5	5.48	5.00	10.00	6.80	+	10.62	4.47	5.00	4.47	270.0	1.5
126.0	+	8.33	75.00	10.00	+	8.33	4.41	4.84	4.41	270.0	1.5
153.5	8.24	9.33	+	+	+	+	17.50	6.36	6.36	316.0	1.5
161.4	8.43	15.73	47.20	3.15	+	8.74	+	3.81	3.15	136.0	2.0
214.1	6.19	+	+	+	+	+	4.06	5.91	4.06	270.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 2.81 AT THE 39.7 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	31.55	32.64	40.72	12.60	21.69	15.53	13.59	13.18	12.60	136.0	2.0
11.0	9.05	6.83	6.80	7.97	8.96	7.01	8.37	34.31	6.80	90.0	1.5
30.7	6.66	8.69	15.19	9.86	11.61	6.96	6.11	7.30	6.11	270.0	1.5
36.2	8.92	10.22	15.25	16.68	13.88	8.67	8.47	8.84	8.47	270.0	1.5
39.7	5.74	6.94	10.03	6.02	7.96	7.42	5.90	4.73	4.73	316.0	1.5
44.6	13.33	11.94	+	45.75	18.70	20.61	7.45	14.44	7.45	270.0	1.5
48.0	9.61	15.50	41.44	22.94	+	19.63	8.71	11.37	8.71	270.0	1.5
71.5	6.13	5.62	11.24	7.52	+	11.25	4.92	5.53	4.92	270.0	1.5
126.0	+	9.22	84.00	10.73	+	9.11	4.91	5.29	4.91	270.0	1.5
153.5	9.82	11.40	+	+	+	+	20.87	7.68	7.68	316.0	1.5
161.4	20.25	38.87	+	7.83	+	20.89	+	9.13	7.83	136.0	2.0
214.1	6.71	+	+	+	+	+	4.38	6.36	4.38	270.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 4.38 AT THE 214.1 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 14
RSRM-7A FORWARD CENTER SEGMENT INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.080	0.080	0.064	0.205	0.118	0.169	0.192	0.196	0.143	0.205	1.067
11.0	0.284	0.384	0.381	0.311	0.279	0.375	0.302	0.068	0.306	0.384	0.829
30.7	0.116	0.088	0.052	0.078	0.066	0.112	0.131	0.106	0.097	0.131	0.484
36.2	0.089	0.077	0.052	0.047	0.056	0.093	0.092	0.088	0.083	0.093	0.318
39.7	0.121	0.098	0.070	0.122	0.090	0.098	0.122	0.153	0.109	0.153	0.205
44.6	0.027	0.031	0.002	0.008	0.020	0.018	0.049	0.025	0.023	0.049	0.090
48.0	0.038	0.024	0.009	0.016	0.002	0.019	0.042	0.032	0.022	0.042	0.089
71.5	0.031	0.034	0.017	0.025	0	0.016	0.038	0.034	0.028	0.038	0.086
126.0	0	0.018	0.002	0.015	0	0.018	0.034	0.031	0.016	0.034	0.074
153.5	0.017	0.015	0	0	0	0	0.008	0.022	0.004	0.022	0.059
161.4	0.028	0.015	0.005	0.075	0	0.027	0	0.062	0.021	0.075	0.082
214.1	0.021	0	0	0	0	0	0.032<	0.022	0	0.032	0.029
280.0	0	0	0	0	0	0	0	0	0	0	0.005
298.0	0	0	0	0	0	0	0	0	0	0	0.005
307.8	0	0	0	0	0	0	0	0	0	0	0.003
311.8	0	0	0	0	0	0	0	0	0	0	0.003
314.0	0	0	0	0	0	0	0	0	0	0	0.003

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	AVE.	EXPOSURE TIME
3.5	0.7	0.7	0.6	1.8	1.0	1.5	1.7	1.7	1.2	113.0
11.0	2.9	3.9	3.9	3.2	2.8	3.8	3.1	0.7	3.0	98.3
30.7	2.4	1.8	1.1	1.6	1.4	2.3	2.7	2.2	1.9	48.1
36.2	2.7	2.3	1.6	1.4	1.7	2.8	2.8	2.6	2.2	33.3
39.7	5.3	4.3	3.1	5.4	3.9	4.3	5.4	6.7	4.8	22.8
44.6	2.1	2.4	0.2	0.6	1.6	1.4	3.8	2.0	1.8	12.8
48.0	3.1	2.0	0.7	1.3	0.2	1.6	3.5	2.6	1.9	12.1
71.5	2.8	3.1	1.5	2.3	0	1.5	3.5	3.1	2.2	11.0
126.0	0	1.9	0.2	1.6	0	1.9	3.5	3.2	1.5	9.6
153.5	1.9	1.7	0	0	0	0	0.9	2.5	0.9	8.8
161.4	2.6	1.4	0.5	6.9	0	2.5	0	5.7	2.5	10.8
214.1	2.9	0	0	0	0	0	4.4	3.1	1.3	7.2
280.0	0	0	0	0	0	0	0	0	0	4.2
298.0	0	0	0	0	0	0	0	0	0	4.0
307.8	0	0	0	0	0	0	0	0	0	3.4
311.8	0	0	0	0	0	0	0	0	0	3.4
314.0	0	0	0	0	0	0	0	0	0	0.6

MOTOR ACTION TIME = 123.6 SECONDS

TABLE 14
RSRM-7A FORWARD CENTER SEGMENT INSULATION PERFORMANCE

PART NO. 1U76667-01 PREFIRE MEASUREMENTS
SERIAL NO. 0000007 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN	MDT
3.5	2.524	2.611	2.606	2.584	2.560	2.625	2.609	2.584	2.524	2.595	2.120
11.0	2.571	2.623	2.590	2.478	2.501	2.628	2.528	2.333	2.333	2.550	1.900
30.7	0.772	0.765	0.790	0.769	0.766	0.780	0.801	0.774	0.765	0.773	0.750
36.2	0.794	0.787	0.793	0.784	0.777	0.806	0.779	0.778	0.777	0.785	0.600
39.7	0.695	0.680	0.702	0.735	0.716	0.727	0.720	0.723	0.680	0.718	0.430
44.6	0.360	0.370	0.370	0.366	0.374	0.371	0.365	0.361	0.360	0.368	0.360
48.0	0.365	0.372	0.373	0.367	0.365	0.373	0.366	0.364	0.364	0.367	0.288
71.5	0.190	0.191	0.191	0.188	0.190	0.180	0.187	0.188	0.180	0.189	0.170
126.0	0.170	0.166	0.168	0.161	0.168	0.164	0.167	0.164	0.161	0.167	0.150
153.5	0.167	0.171	0.172	0.163	0.166	0.168	0.167	0.169	0.163	0.168	0.140
161.4	0.567	0.583	0.541	0.587	0.528	0.564	0.570	0.566	0.528	0.567	0.236
214.1	0.141	0.143	0.144	0.139	0.141	0.137	0.140	0.140	0.137	0.141	0.130
280.0	0.117	0.119	0.122	0.114	0.117	0.116	0.117	0.116	0.114	0.117	0.090
298.0	0.116	0.119	0.122	0.114	0.122	0.118	0.118	0.125	0.114	0.119	0.090
307.8	0.118	0.122	0.119	0.113	0.118	0.117	0.119	0.112	0.112	0.118	0.090
311.8	0.117	0.118	0.120	0.113	0.117	0.115	0.117	0.111	0.111	0.117	0.090
314.0	0.117	0.120	0.122	0.114	0.118	0.118	0.121	0.112	0.112	0.118	0.090

PART NO. 1U76651-03 POSTFIRE MEASUREMENTS
SERIAL NO. 0000003 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN
3.5	2.444	2.531	2.542	2.379	2.442	2.456	2.417	2.388	2.379	2.443
11.0	2.287	2.239	2.209	2.167	2.222	2.253	2.226	2.265	2.167	2.233
30.7	0.656	0.677	0.738	0.691	0.700	0.668	0.670	0.668	0.656	0.674
36.2	0.705	0.710	0.741	0.737	0.721	0.713	0.687	0.690	0.687	0.711
39.7	0.574	0.582	0.632	0.613	0.626	0.629	0.598	0.570	0.570	0.605
44.6	0.333	0.339	0.368	0.358	0.354	0.353	0.316	0.336	0.316	0.346
48.0	0.327	0.348	0.364	0.351	0.363	0.354	0.324	0.332	0.324	0.350
71.5	0.159	0.157	0.174	0.163	L	0.164	0.149	0.154	0.149	0.161
126.0	0.179	0.148	0.166	0.146	L	0.146	0.133	0.133	0.133	0.147
153.5	0.150	0.156	L	L	L	L	0.159	0.147	0.147	0.161
161.4	0.539	0.568	0.536	0.512	0.697	0.537	0.645	0.504	0.504	0.538
214.1	0.120	L	L	L	L	L	0.108	0.118	0.108	0.138
280.0	L	L	L	L	L	L	L	L	L	0.117
298.0	L	L	L	L	L	L	L	L	L	0.119
307.8	L	L	L	L	L	L	L	L	L	0.118
311.8	L	L	L	L	L	L	L	L	L	0.117
314.0	L	L	L	L	L	L	L	L	L	0.118

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 15
RSRM-7A FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	PLANE	REQUIRED S.F.
3.5	21.20	15.36	13.17	15.04	13.01	13.01	352.0	2.0
13.0	10.83	8.67	10.16	8.02	7.47	7.47	352.0	1.5
27.0	+	+	+	+	+	+	90.0	1.5
30.7	+	+	+	+	+	+	90.0	1.5
34.2	+	+	+	+	+	+	90.0	1.5
37.7	+	+	+	+	+	+	90.0	1.5
41.2	+	+	+	+	+	+	90.0	1.5
44.0	+	+	+	+	+	+	90.0	1.5
94.7	+	+	+	+	+	+	90.0	1.5
142.0	+	+	+	+	+	+	90.0	1.5
145.7	58.50	+	+	+	+	58.50	90.0	1.5
148.5	11.50	+	+	+	+	11.50	90.0	1.5
152.0	19.81	8.34	9.32	22.64	24.38	8.34	154.0	1.5
162.0	3.85	3.91	3.46	3.06	6.15	3.06	286.0	2.0
175.5	4.54	2.78	3.64	3.41	3.53	2.78	154.0	1.5
187.0	3.46	3.05	3.58	3.02	3.25	3.02	286.0	1.5
199.0	2.72	2.74	2.54	2.52	2.71	2.52	286.0	1.5
215.0	2.97	3.33	4.35	3.09	3.92	2.97	90.0	1.5
224.0	2.79	2.27	2.51	2.72	3.31	2.27	154.0	1.5
230.0	2.79	2.81	3.33	2.47	3.09	2.47	286.0	1.5
236.0	2.70	2.69	2.31	2.39	2.63	2.31	222.0	1.5
240.0	2.88	2.19	2.57	2.60	2.72	2.19	154.0	1.5
251.0	2.45	2.30	2.43	2.30	3.34	2.30	286.0	1.5
263.0	2.62	3.01	2.55	2.94	3.26	2.55	222.0	1.5
280.0	2.65	1.91	1.71	2.34	1.97	1.71	222.0	1.5
293.0	2.90	3.16	2.87	2.35	3.21	2.35	286.0	1.5
305.0	2.60	1.94	1.84	2.06	2.12	1.84	222.0	1.5
312.0	3.04	2.33	2.18	2.19	2.45	2.18	222.0	1.5
321.0	5.31	4.10	5.77	5.40	3.15	3.15	352.0	2.0
330.0	3.20	2.56	2.73	1.81	2.47	1.81	286.0	1.5
347.0	1.93	2.25	2.51	1.92	4.09	1.92	286.0	1.5
359.0	3.49	2.81	2.71	2.87	2.86	2.71	222.0	1.5
371.0	3.44	2.84	3.11	5.84	2.63	2.63	352.0	1.5
383.0	2.73	2.61	2.49	4.82	3.17	2.49	222.0	1.5
394.0	4.02	2.1	2.37	2.84	3.07	2.11	154.0	1.5

SEGMENT MINIMUM = 1.71 AT THE 280.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	PLANE
3.5	26.74	19.41	16.42	18.62	16.21	16.21	352.0
13.0	14.18	11.20	12.36	10.00	9.43	9.43	352.0
27.0	+	+	+	+	+	+	90.0
30.7	+	+	+	+	+	+	90.0
34.2	+	+	+	+	+	+	90.0
37.7	+	+	+	+	+	+	90.0
41.2	+	+	+	+	+	+	90.0
44.0	+	+	+	+	+	+	90.0
94.7	+	+	+	+	+	+	90.0
142.0	+	+	+	+	+	+	90.0
145.7	64.75	+	+	+	+	64.75	90.0
148.5	11.71	+	+	+	+	11.71	90.0
152.0	21.81	9.13	10.18	25.00	26.77	9.13	154.0
162.0	5.37	5.37	4.77	4.40	7.93	4.40	286.0
175.5	5.38	3.36	4.33	3.91	4.21	3.36	154.0
187.0	3.56	3.16	3.75	3.09	3.25	3.09	286.0
199.0	2.87	2.92	2.71	2.68	2.80	2.68	286.0
215.0	2.99	3.42	4.42	3.18	3.96	2.99	90.0
224.0	3.07	2.48	2.80	2.96	3.51	2.48	154.0
230.0	2.78	2.81	3.22	2.42	2.90	2.42	286.0
236.0	2.89	2.94	2.54	2.53	2.78	2.53	286.0
240.0	3.07	2.42	2.71	2.74	2.84	2.42	154.0
251.0	3.04	2.95	3.00	2.85	4.11	2.85	286.0
263.0	2.71	3.10	2.74	3.01	3.33	2.71	90.0
280.0	3.12	2.32	2.14	2.65	2.39	2.14	222.0
293.0	3.01	3.39	3.02	2.41	3.31	2.41	286.0
305.0	2.88	2.48	2.16	2.49	2.54	2.16	222.0
312.0	3.47	2.82	2.64	2.58	2.95	2.58	286.0
321.0	5.73	4.24	5.99	5.67	3.43	3.43	352.0
330.0	5.55	4.53	4.76	3.15	4.26	3.15	286.0
347.0	2.34	2.72	2.98	2.31	4.64	2.31	286.0
359.0	3.70	3.10	3.04	3.15	3.27	3.04	222.0
371.0	3.66	2.98	3.40	6.57	2.86	2.86	352.0
383.0	2.91	2.99	2.84	5.22	3.45	2.84	222.0
394.0	4.58	2.46	2.78	3.16	3.39	2.46	154.0

SEGMENT MINIMUM = 2.14 AT THE 280.0 INCH STATION

A

TABLE 15
RSRM-7A FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.100	0.138	<0.161	<0.141	<0.163	0.141	0.163	0.103
13.0	0.060	0.075	0.064	0.081	0.087	0.075	0.087	0.101
27.0	0	0	0	0	0	0	0	0.044
30.7	0	0	0	0	0	0	0	0.033
34.2	0	0	0	0	0	0	0	0.035
37.7	0	0	0	0	0	0	0	0.028
41.2	0	0	0	0	0	0	0	0.023
44.0	0	0	0	0	0	0	0	0.015
94.7	0	0	0	0	0	0	0	0.004
142.0	0	0	0	0	0	0	0	0.019
145.7	0.004	0	0	0	0	0	0.004	0.081
148.5	0.024	0	0	0.001	0	0	0.024	0.135
152.0	0.016	0.038	0.034	0.014	0.013	0.016	0.038	0.123
162.0	0.142	0.140	0.158	0.179	0.089	0.142	0.179	0.227
175.5	0.133	0.217	0.166	0.177	0.171	0.171	0.217	0.324
187.0	0.185	0.210	0.179	0.212	0.197	0.197	0.212	0.398
199.0	0.236	0.235	0.253	0.255	0.237	0.237	0.255	0.427
215.0	0.215	0.192	0.147	0.207	0.163	0.192	0.215	0.423
224.0	0.229	0.282	0.255	0.235	0.193	0.235	0.282	0.422
230.0	0.229	0.227	0.192	0.259	0.207	0.227	0.259	0.375
236.0	0.214	0.215	0.250	0.242	0.220	0.220	0.250	0.327
240.0	0.199	0.262	0.223	0.221	0.211	0.221	0.262	0.342
251.0	0.232	0.247	0.234	0.247	0.170	0.234	0.247	0.313
263.0	0.217	0.189	0.223	0.193	0.174	0.193	0.223	0.334
280.0	0.214	0.297	0.333	0.243	0.288	0.288	0.333	0.352
293.0	0.188	0.173	0.190	0.232	0.170	0.188	0.232	0.330
305.0	0.202	0.270	0.286	0.255	0.248	0.255	0.286	0.309
312.0	0.178	0.232	0.248	0.247	0.221	0.232	0.248	0.308
321.0	0.173	0.224	0.159	0.170	0.291	0.173	0.291	0.434
330.0	0.172	0.215	0.202	0.304	0.223	0.215	0.304	0.333
347.0	0.271	0.232	0.208	0.272	0.128	0.232	0.272	0.307
359.0	0.149	0.185	0.192	0.181	0.182	0.182	0.192	0.279
371.0	0.151	0.183	0.167	0.089	0.198	0.167	0.198	0.304
383.0	0.187	0.196	0.205	0.106	0.161	0.187	0.205	0.295
394.0	0.125	0.238	0.212	0.177	0.164	0.177	0.238	0.287

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	AVE.	EXPOSURE TIME
3.5	2.9	4.0	4.7	4.1	4.7	4.1	34.5
13.0	3.1	3.9	3.3	4.2	4.5	3.8	19.4
27.0	0	0	0	0	0	0	4.8
30.7	0	0	0	0	0	0	4.8
34.2	0	0	0	0	0	0	4.2
37.7	0	0	0	0	0	0	3.6
41.2	0	0	0	0	0	0	3.6
44.0	0	0	0	0	0	0	3.0
94.7	0	0	0	0	0	0	0.8
142.0	0	0	0	0	0	0	1.0
145.7	0.3	0	0	0	0	0.1	13.8
148.5	1.1	0	0	0	0	0.2	22.4
152.0	0.5	1.2	1.0	0.4	0.4	0.7	32.7
162.0	2.4	2.4	2.7	3.1	1.5	2.4	58.1
175.5	1.5	2.4	1.9	2.0	1.9	1.9	89.3
187.0	1.8	2.1	1.8	2.1	1.9	1.9	102.2
199.0	2.3	2.3	2.5	2.5	2.3	2.4	102.2
215.0	2.1	1.9	1.4	2.0	1.6	1.8	102.2
224.0	2.2	2.8	2.5	2.3	1.9	2.3	102.2
230.0	2.2	2.2	1.9	2.5	2.0	2.2	102.2
236.0	2.1	2.1	2.4	2.4	2.2	2.2	102.2
240.0	1.9	2.6	2.2	2.2	2.1	2.2	102.2
251.0	2.3	2.4	2.3	2.4	1.7	2.2	102.2
263.0	2.1	1.8	2.2	1.9	1.7	1.9	102.2
280.0	2.1	2.9	3.3	2.4	2.8	2.7	102.2
293.0	1.8	1.7	1.9	2.3	1.7	1.9	102.2
305.0	2.0	2.6	2.8	2.5	2.4	2.5	102.2
312.0	1.7	2.3	2.4	2.4	2.2	2.2	102.2
321.0	1.7	2.1	1.5	1.6	2.8	1.9	104.4
330.0	1.7	2.1	2.0	3.0	2.2	2.2	102.8
347.0	2.7	2.3	2.1	2.7	1.3	2.2	100.2
359.0	1.5	1.9	1.9	1.8	1.8	1.8	99.8
371.0	1.6	1.9	1.8	0.9	2.1	1.7	95.2
383.0	1.9	2.0	2.1	1.1	1.7	1.8	96.4
394.0	1.3	2.4	2.2	1.8	1.7	1.9	98.0

MOTOR ACTION TIME = 123.4 SECONDS

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

TABLE 15
RSRM-7A FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

PREFIRE MEASUREMENTS INCHES — PART NO. 1U76666-01 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	MEDIAN	MDT
3.5	2.674	2.679	2.644	2.626	2.643	2.626	2.644	2.120
13.0	0.851	0.840	0.791	0.810	0.820	0.791	0.820	0.650
27.0	0.594	0.602	0.590	0.614	0.586	0.586	0.594	0.450
30.7	0.424	0.420	0.412	0.416	0.410	0.410	0.416	0.400
34.2	0.437	0.431	0.438	0.439	0.442	0.431	0.438	0.380
37.7	0.343	0.337	0.339	0.347	0.341	0.337	0.341	0.330
41.2	0.299	0.284	0.283	0.286	0.293	0.283	0.286	0.280
44.0	0.294	0.296	0.289	0.290	0.298	0.289	0.294	0.250
94.7	0.108	0.108	0.108	0.108	0.112	0.108	0.108	0.090
142.0	0.161	0.163	0.165	0.165	0.166	0.161	0.165	0.113
145.7	0.259	0.269	0.266	0.261	0.269	0.259	0.266	0.234
148.5	0.281	0.290	0.281	0.288	0.282	0.281	0.282	0.276
152.0	0.349	0.347	0.346	0.350	0.348	0.346	0.348	0.317
162.0	0.762	0.752	0.753	0.787	0.706	0.706	0.753	0.547
175.5	0.716	0.730	0.748	0.692	0.720	0.692	0.718	0.604
187.0	0.658	0.663	0.672	0.656	0.641	0.641	0.658	0.640
199.0	0.678	0.686	0.686	0.684	0.663	0.663	0.684	0.643
215.0	0.643	0.656	0.650	0.658	0.645	0.643	0.650	0.639
224.0	0.704	0.699	0.714	0.695	0.677	0.677	0.699	0.639
230.0	0.636	0.639	0.619	0.628	0.601	0.601	0.628	0.639
236.0	0.619	0.632	0.634	0.613	0.611	0.611	0.619	0.578
240.0	0.610	0.634	0.604	0.606	0.599	0.599	0.606	0.574
251.0	0.705	0.728	0.701	0.704	0.699	0.699	0.704	0.568
263.0	0.587	0.585	0.612	0.580	0.580	0.580	0.585	0.568
280.0	0.668	0.689	0.713	0.644	0.688	0.644	0.688	0.568
293.0	0.565	0.587	0.573	0.559	0.563	0.559	0.565	0.546
305.0	0.582	0.670	0.619	0.634	0.631	0.582	0.631	0.525
312.0	0.618	0.655	0.654	0.637	0.651	0.618	0.651	0.541
321.0	0.992	0.950	0.953	0.964	0.999	0.950	0.964	0.918
330.0	0.954	0.973	0.962	0.957	0.949	0.949	0.957	0.551
347.0	0.634	0.631	0.619	0.628	0.594	0.594	0.628	0.523
359.0	0.551	0.574	0.584	0.571	0.596	0.551	0.574	0.520
371.0	0.553	0.546	0.567	0.585	0.566	0.546	0.566	0.520
383.0	0.545	0.587	0.583	0.553	0.556	0.545	0.556	0.511
394.0	0.572	0.586	0.590	0.559	0.556	0.556	0.572	0.503

POSTFIRE MEASUREMENTS INCHES — PART NO. 1U76650-03 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	MEDIAN
3.5	2.574	2.541	2.483	2.485	2.480	2.480	2.485
13.0	0.791	0.765	0.727	0.729	0.733	0.727	0.733
27.0	L	L	L	L	L	L	0.594
30.7	L	L	L	L	L	L	0.416
34.2	L	L	L	L	L	L	0.438
37.7	L	L	L	L	L	L	0.341
41.2	L	L	L	L	L	L	0.286
44.0	L	L	L	L	L	L	0.294
94.7	L	L	L	L	L	L	0.108
142.0	L	L	L	L	L	L	0.165
145.7	0.255	0.315	0.332	0.286	0.315	0.255	0.315
148.5	0.257	0.307	0.327	0.287	0.296	0.257	0.296
152.0	0.333	0.309	0.312	0.336	0.335	0.309	0.333
162.0	0.620	0.612	0.595	0.608	0.617	0.595	0.612
175.5	0.583	0.513	0.552	0.515	0.549	0.513	0.549
187.0	0.473	0.453	0.493	0.444	0.444	0.444	0.453
199.0	0.442	0.451	0.433	0.429	0.426	0.426	0.433
215.0	0.428	0.464	0.503	0.451	0.482	0.428	0.464
224.0	0.475	0.417	0.459	0.460	0.484	0.417	0.460
230.0	0.407	0.412	0.427	0.369	0.394	0.369	0.407
236.0	0.405	0.417	0.384	0.371	0.391	0.371	0.391
240.0	0.411	0.372	0.381	0.385	0.388	0.372	0.385
251.0	0.473	0.481	0.467	0.457	0.529	0.457	0.473
263.0	0.370	0.396	0.389	0.387	0.406	0.370	0.389
280.0	0.454	0.392	0.380	0.401	0.400	0.380	0.400
293.0	0.377	0.414	0.383	0.327	0.393	0.327	0.383
305.0	0.380	0.400	0.333	0.379	0.383	0.333	0.380
312.0	0.440	0.423	0.406	0.390	0.430	0.390	0.423
321.0	0.819	0.726	0.794	0.794	0.708	0.708	0.794
330.0	0.782	0.758	0.760	0.653	0.726	0.653	0.758
347.0	0.363	0.399	0.411	0.356	0.466	0.356	0.399
359.0	0.402	0.389	0.392	0.390	0.414	0.389	0.392
371.0	0.402	0.363	0.400	0.496	0.368	0.363	0.400
383.0	0.358	0.391	0.378	0.447	0.395	0.358	0.391
394.0	0.447	0.348	0.378	0.382	0.392	0.348	0.382

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 16
RSRM-7A FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	PLANE	REQUIRED S.F.
3.5	24.09	10.93	9.72	18.28	16.43	9.72	206.0	2.0
13.0	11.61	12.50	9.42	7.74	30.95	7.74	270.0	1.5
27.0	+	+	+	+	+	+	74.0	1.5
30.7	+	+	+	+	+	+	74.0	1.5
34.2	+	+	+	+	+	+	74.0	1.5
37.7	+	+	+	+	+	+	74.0	1.5
41.2	+	+	+	+	+	+	74.0	1.5
44.0	+	+	+	+	+	+	74.0	1.5
94.7	+	+	+	+	+	+	74.0	1.5
142.0	+	+	+	+	+	+	74.0	1.5
145.7	+	+	+	+	+	+	74.0	1.5
148.5	+	+	+	+	+	+	74.0	1.5
152.0	+	11.74	39.63	+	+	11.74	140.0	1.5
162.0	8.29	6.01	5.58	5.88	+	5.58	206.0	2.0
175.5	4.22	4.35	3.28	3.82	4.47	3.28	206.0	1.5
187.0	4.21	7.71	5.42	4.96	4.85	4.21	74.0	1.5
199.0	4.56	3.78	4.73	9.32	5.31	3.78	140.0	1.5
215.0	6.09	7.61	9.13	8.52	9.54	6.09	74.0	1.5
224.0	5.56	3.69	4.20	5.56	5.03	3.69	140.0	1.5
230.0	5.71	4.41	4.50	5.46	4.70	4.41	140.0	1.5
236.0	4.70	3.55	5.03	4.16	4.66	3.55	140.0	1.5
240.0	4.56	4.70	4.19	4.16	3.83	3.83	336.0	1.5
251.0	3.92	4.18	4.81	5.31	5.07	3.92	74.0	1.5
263.0	5.41	4.24	5.21	5.36	4.77	4.24	140.0	1.5
280.0	5.74	3.17	2.49	2.69	4.98	2.49	206.0	1.5
293.0	4.88	2.94	5.81	4.63	4.01	2.94	140.0	1.5
305.0	6.18	3.28	2.05	2.69	5.36	2.05	206.0	1.5
312.0	6.22	3.63	4.75	6.85	6.85	3.63	140.0	1.5
321.0	7.17	6.75	14.34	+	8.12	6.75	140.0	2.0
330.0	3.08	3.22	6.80	6.19	3.17	3.08	74.0	1.5
347.0	2.95	2.51	3.61	3.08	2.95	2.51	140.0	1.5
359.0	3.94	3.91	3.85	3.01	2.78	2.78	336.0	1.5
371.0	2.83	3.10	2.51	2.59	4.13	2.51	206.0	1.5
383.0	2.61	2.63	2.09	2.54	4.78	2.09	206.0	1.5
394.0	2.45	2.86	2.87	2.25	2.21	2.21	336.0	1.5

SEGMENT MINIMUM = 2.05 AT THE 305.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	PLANE
3.5	30.34	13.77	12.09	22.59	20.98	12.09	206.0
13.0	15.64	15.96	11.54	10.00	37.00	10.00	270.0
27.0	+	+	+	+	+	+	74.0
30.7	+	+	+	+	+	+	74.0
34.2	+	+	+	+	+	+	74.0
37.7	+	+	+	+	+	+	74.0
41.2	+	+	+	+	+	+	74.0
44.0	+	+	+	+	+	+	74.0
94.7	+	+	+	+	+	+	74.0
142.0	+	+	+	+	+	+	74.0
145.7	+	+	+	+	+	+	74.0
148.5	+	+	+	+	+	+	74.0
152.0	+	13.19	42.38	+	+	13.19	140.0
162.0	10.89	7.76	7.59	7.86	+	7.59	206.0
175.5	5.08	5.21	4.22	4.56	5.35	4.22	206.0
187.0	4.43	7.95	5.66	5.06	5.00	4.43	74.0
199.0	4.78	3.99	5.07	9.80	5.47	3.99	140.0
215.0	6.25	7.68	9.34	8.77	9.91	6.25	74.0
224.0	6.01	3.98	4.62	6.26	5.46	3.98	140.0
230.0	5.47	4.30	4.42	5.38	4.54	4.30	140.0
236.0	5.02	3.88	5.25	4.46	4.92	3.88	140.0
240.0	4.98	4.89	4.55	4.51	4.15	4.15	336.0
251.0	5.16	5.18	5.96	6.69	6.43	5.16	74.0
263.0	5.53	4.34	5.52	5.56	4.92	4.34	140.0
280.0	6.40	3.66	2.96	3.36	5.69	2.96	206.0
293.0	4.96	3.40	5.96	4.75	4.27	3.40	140.0
305.0	6.42	3.78	2.67	3.21	6.19	2.67	206.0
312.0	7.21	4.13	5.72	8.35	8.24	4.13	140.0
321.0	7.93	7.29	15.22	+	8.83	7.29	140.0
330.0	5.45	5.54	11.90	10.91	5.51	5.45	74.0
347.0	3.35	2.92	3.95	3.59	3.59	2.92	140.0
359.0	4.36	4.21	4.32	3.46	3.20	3.20	336.0
371.0	3.03	3.40	2.86	2.93	4.76	2.86	206.0
383.0	2.97	2.95	2.45	2.79	5.08	2.45	206.0
394.0	2.75	3.19	3.31	2.59	2.53	2.53	336.0

SEGMENT MINIMUM = 2.45 AT THE 383.0 INCH STATION

A

TABLE 16
RSRM-7A FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD) INCHES

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.088	0.194<	0.218<	0.116<	0.129<	0.129	0.218	0.103
13.0	0.056	0.052	0.069	0.084	0.021	0.056	0.084	0.101
27.0	0	0	0	0	0	0	0	0.044
30.7	0	0	0	0	0	0	0	0.033
34.2	0	0	0	0	0	0	0	0.035
37.7	0	0	0	0	0	0	0	0.028
41.2	0	0	0	0	0	0	0	0.023
44.0	0	0	0	0	0	0	0	0.015
94.7	0	0	0	0	0	0	0	0.004
142.0	0	0	0	0	0	0	0	0.019
145.7	0	0	0	0	0	0	0	0.081
148.5	0	0	0	0	0	0	0	0.135
152.0	0	0.027	0.008	0	0	0	0.027	0.123
162.0	0.066	0.091	0.098	0.093	0.002	0.091	0.098	0.227
175.5	0.143	0.139	0.184	0.158	0.135	0.143	0.184	0.324
187.0	0.152	0.083	0.118	0.129	0.132	0.129	0.152	0.398
199.0	0.141	0.170	0.136	0.069	0.121	0.136	0.170	0.427
215.0	0.105	0.084	0.070	0.075	0.067	0.075	0.105	0.423
224.0	0.115	0.173	0.152	0.115	0.127	0.127	0.173	0.422
230.0	0.112	0.145	0.142	0.117	0.136	0.136	0.145	0.375
236.0	0.123	0.163	0.115	0.139	0.124	0.124	0.163	0.327
240.0	0.126	0.122	0.137	0.138	0.150	0.137	0.150	0.342
251.0	0.145	0.136	0.118	0 107	0.112	0.118	0.145	0.313
263.0	0.105	0.134	0.109	0.106	0.119	0.109	0.134	0.334
280.0	0.099	0.179	0.228	0.211	0.114	0.179	0.228	0.352
293.0	0.112	0.186	0.094	0.118	0.136	0.118	0.186	0.330
305.0	0.085	0.160	0.256	0.195	0.098	0.160	0.256	0.309
312.0	0.087	0.149	0.114	0.079	0.079	0.087	0.149	0.308
321.0	0.128	0.136	0.064	0	0.113	0.113	0.136	0.434
330.0	0.179	0.171	0.081	0.089	0.174	0.171	0.179	0.333
347.0	0.177	0.208	0.145	0.170	0.177	0.177	0.208	0.307
359.0	0.132	0.133	0.135	0.173	0.187	0.135	0.187	0.279
371.0	0.184	0.168	0.207	0.201	0.126	0.184	0.207	0.304
383.0	0.196	0.194	0.244	0.201	0.107	0.196	0.244	0.295
394.0	0.205	0.176	0.175	0.224	0.228	0.205	0.228	0.287

MATERIAL DECOMPOSITION RATE (MDR) MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	AVE.	EXPOSURE TIME
3.5	2.6	5.6	6.3	3.4	3.7	4.3	34.5
13.0	2.9	2.7	3.6	4.3	1.1	2.9	19.4
27.0	0	0	0	0	0	0	4.8
30.7	0	0	0	0	0	0	4.8
34.2	0	0	0	0	0	0	4.2
37.7	0	0	0	0	0	0	3.6
41.2	0	0	0	0	0	0	3.6
44.0	0	0	0	0	0	0	3.0
94.7	0	0	0	0	0	0	0.8
142.0	0	0	0	0	0	0	1.0
145.7	0	0	0	0	0	0	2.0
148.5	0	0	0	0	0	0	10.8
152.0	0	1.3	0.4	0	0	0.3	20.8
162.0	1.5	2.0	2.2	2.1	0	1.6	44.5
175.5	2.1	2.0	2.7	2.3	2.0	2.2	68.5
187.0	2.3	1.2	1.8	1.9	2.0	1.8	66.7
199.0	2.1	2.5	2.0	1.0	1.8	1.9	66.7
215.0	1.6	1.3	1.0	1.1	1.0	1.2	66.7
224.0	1.7	2.6	2.3	1.7	1.9	2.0	66.7
230.0	1.7	2.2	2.1	1.8	2.0	2.0	66.7
236.0	1.8	2.4	1.7	2.1	1.9	2.0	66.7
240.0	1.9	1.8	2.1	2.1	2.2	2.0	66.7
251.0	2.2	2.0	1.8	1.6	1.7	1.9	66.7
263.0	1.6	2.0	1.6	1.6	1.8	1.7	66.7
280.0	1.5	2.7	3.4	3.2	1.7	2.5	66.7
293.0	1.7	2.8	1.4	1.8	2.0	1.9	66.7
305.0	1.3	2.4	3.8	2.9	1.5	2.4	66.7
312.0	1.3	2.2	1.7	1.2	1.2	1.5	66.7
321.0	1.8	1.9	0.9	0	1.6	1.2	71.1
330.0	2.5	2.4	1.1	1.3	2.5	2.0	70.7
347.0	2.4	2.8	1.9	2.3	2.4	2.3	74.9
359.0	1.6	1.7	1.7	2.2	2.3	1.9	80.1
371.0	2.2	2.0	2.5	2.4	1.5	2.2	82.3
383.0	2.2	2.2	2.7	2.2	1.2	2.1	89.7
394.0	2.2	1.9	1.9	2.4	2.4	2.1	94.4

MOTOR ACTION TIME = 123.4 SECONDS

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

TABLE 16
RSRM-7A FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

PREFIRE MEASUREMENTS INCHES — PART NO. 1U76666-01 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	MEDIAN	MDT
3.5	2.670	2.672	2.635	2.620	2.706	2.620	2.670	2.120
13.0	0.876	0.830	0.796	0.840	0.777	0.777	0.830	0.650
27.0	0.593	0.601	0.605	0.613	0.577	0.577	0.601	0.450
30.7	0.410	0.411	0.405	0.424	0.414	0.405	0.411	0.400
34.2	0.440	0.431	0.438	0.444	0.438	0.431	0.438	0.380
37.7	0.343	0.336	0.337	0.348	0.343	0.336	0.343	0.330
41.2	0.284	0.284	0.282	0.294	0.286	0.282	0.284	0.280
44.0	0.288	0.291	0.285	0.293	0.292	0.285	0.291	0.250
94.7	0.109	0.109	0.106	0.109	0.110	0.106	0.109	0.090
142.0	0.165	0.167	0.168	0.170	0.172	0.165	0.168	0.113
145.7	0.257	0.259	0.264	0.259	0.273	0.257	0.259	0.234
148.5	0.285	0.287	0.287	0.280	0.283	0.280	0.285	0.276
152.0	0.349	0.356	0.339	0.345	0.362	0.339	0.349	0.317
162.0	0.719	0.706	0.744	0.731	0.739	0.706	0.731	0.547
175.5	0.727	0.724	0.776	0.720	0.722	0.720	0.724	0.604
187.0	0.673	0.660	0.668	0.653	0.660	0.653	0.660	0.640
199.0	0.674	0.678	0.690	0.676	0.662	0.662	0.676	0.643
215.0	0.656	0.645	0.654	0.658	0.664	0.645	0.656	0.639
224.0	0.691	0.689	0.703	0.720	0.694	0.689	0.694	0.639
230.0	0.613	0.623	0.628	0.630	0.618	0.613	0.623	0.639
236.0	0.618	0.633	0.604	0.620	0.610	0.604	0.618	0.578
240.0	0.627	0.597	0.624	0.623	0.622	0.597	0.623	0.574
251.0	0.748	0.705	0.703	0.716	0.720	0.703	0.716	0.568
263.0	0.581	0.581	0.602	0.589	0.585	0.581	0.585	0.568
280.0	0.634	0.655	0.675	0.709	0.649	0.634	0.655	0.568
293.0	0.556	0.632	0.560	0.560	0.581	0.556	0.560	0.546
305.0	0.546	0.605	0.684	0.625	0.607	0.546	0.607	0.525
312.0	0.627	0.616	0.652	0.660	0.651	0.616	0.651	0.541
321.0	1.015	0.992	0.974	0.982	0.998	0.974	0.992	0.918
330.0	0.975	0.948	0.964	0.971	0.959	0.948	0.964	0.551
347.0	0.593	0.607	0.573	0.610	0.635	0.573	0.607	0.523
359.0	0.575	0.560	0.583	0.599	0.598	0.560	0.583	0.520
371.0	0.557	0.571	0.593	0.588	0.600	0.557	0.588	0.520
383.0	0.583	0.572	0.597	0.560	0.544	0.544	0.572	0.511
394.0	0.564	0.561	0.580	0.580	0.577	0.561	0.577	0.503

POSTFIRE MEASUREMENTS INCHES — PART NO. 1U76650-03 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	MEDIAN
3.5	2.582	2.478	2.417	2.504	2.577	2.417	2.504
13.0	0.820	0.778	0.727	0.756	0.756	0.727	0.756
27.0	L	L	L	L	L	L	0.601
30.7	L	L	L	L	L	L	0.411
34.2	L	L	L	L	L	L	0.438
37.7	L	L	L	L	L	L	0.343
41.2	L	L	L	L	L	L	0.284
44.0	L	L	L	L	L	L	0.291
94.7	L	L	L	L	L	L	0.109
142.0	L	L	L	L	L	L	0.168
145.7	L	L	L	L	L	L	0.259
148.5	L	0.317	L	L	L	0.317	0.285
152.0	0.361	0.329	0.331	0.379	0.441	0.329	0.361
162.0	0.653	0.615	0.646	0.638	0.737	0.615	0.646
175.5	0.584	0.585	0.592	0.562	0.587	0.562	0.585
187.0	0.521	0.577	0.550	0.524	0.528	0.521	0.528
199.0	0.533	0.508	0.554	0.607	0.541	0.508	0.541
215.0	0.551	0.561	0.584	0.583	0.597	0.551	0.583
224.0	0.576	0.516	0.551	0.605	0.567	0.516	0.567
230.0	0.501	0.478	0.486	0.513	0.482	0.478	0.486
236.0	0.495	0.470	0.489	0.481	0.486	0.470	0.486
240.0	0.501	0.475	0.487	0.485	0.472	0.472	0.485
251.0	0.603	0.569	0.585	0.609	0.608	0.569	0.603
263.0	0.476	0.447	0.493	0.483	0.466	0.447	0.476
280.0	0.535	0.476	0.447	0.498	0.535	0.447	0.498
293.0	0.444	0.446	0.466	0.442	0.445	0.442	0.445
305.0	0.461	0.445	0.428	0.430	0.509	0.428	0.445
312.0	0.540	0.467	0.538	0.581	0.572	0.467	0.540
321.0	0.887	0.856	0.910	1.005	0.885	0.856	0.887
330.0	0.796	0.777	0.883	0.882	0.785	0.777	0.796
347.0	0.416	0.399	0.428	0.440	0.458	0.399	0.428
359.0	0.443	0.427	0.448	0.426	0.411	0.411	0.427
371.0	0.373	0.403	0.386	0.387	0.474	0.373	0.387
383.0	0.387	0.378	0.353	0.359	0.437	0.353	0.378
394.0	0.359	0.385	0.405	0.356	0.349	0.349	0.359

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

RSRM-7B NOZZLE TO CASE JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
0.0	5.559	4.325	1.234	4.0	4.5
21.6	5.506	4.792	0.714	6.9	7.7
46.8	5.532	4.715	0.817	6.0	6.8
68.4	5.507	4.532	0.975	5.0	5.6
90.0	5.514	4.747	0.767	6.4	7.2
111.6	5.491	4.685	0.806	6.1	6.8
136.8	5.533	4.736	0.797	6.1	6.9
158.4	5.435	4.798	0.637	7.7	8.5
180.0	5.532	4.415	1.117	4.4	5.0
201.6	5.471	4.842	0.629	7.8	8.7
226.8	5.489	4.456	1.033	4.7	5.3
248.4	5.202	4.843	0.359	13.6	14.5
270.0	5.536	4.724	0.812	6.0	6.8
291.6	5.541	4.940	0.601	8.2	9.2
316.8	5.507	4.836	0.671	7.3	8.2
338.4	5.510	4.644	0.866	5.7	6.4
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	5.509	4.730	0.802	4.0	4.5

Table 17

RSRM-7B AFT FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.737	2.272	0.465	5.6	5.9
16.0	2.764	2.271	0.493	5.3	5.6
30.0	2.762	2.310	0.452	5.7	6.1
46.0	2.763	2.309	0.454	5.7	6.1
60.0	2.758	2.309	0.449	5.8	6.1
76.0	2.774	2.273	0.501	5.2	5.5
90.0	2.764	2.325	0.439	5.9	6.3
106.0	2.779	2.285	0.494	5.3	5.6
120.0	2.774	2.261	0.513	5.1	5.4
136.0	2.779	2.298	0.481	5.4	5.8
150.0	2.774	2.317	0.457	5.7	6.1
166.0	2.779	2.345	0.434	6.0	6.4
180.0	2.749	2.344	0.405	6.4	6.8
196.0	2.769	2.342	0.427	6.1	6.5
210.0	2.748	2.312	0.436	6.0	6.3
226.0	2.749	2.355	0.394	6.6	7.0
242.0	2.736	2.296	0.440	5.9	6.2
256.0	2.734	2.324	0.410	6.3	6.7
270.0	2.734	2.300	0.434	6.0	6.3
286.0	2.760	2.326	0.434	6.0	6.4
300.0	2.753	2.352	0.401	6.5	6.9
316.0	2.748	2.268	0.480	5.4	5.7
330.0	2.744	2.298	0.446	5.8	6.2
346.0	2.760	2.319	0.441	5.9	6.3
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.760	2.309	0.444	5.1	5.4

Table 18

RSRM-7B CENTER FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.747	2.540	0.207	12.5	13.3
16.0	2.720	2.531	0.189	13.7	14.4
30.0	2.734	2.512	0.222	11.7	12.3
46.0	2.735	2.540	0.195	13.3	14.0
60.0	2.750	2.535	0.215	12.1	12.8
76.0	2.742	2.553	0.189	13.7	14.5
90.0	2.692	2.535	0.157	16.5	17.1
106.0	2.726	2.563	0.163	15.9	16.7
120.0	2.700	2.493	0.207	12.5	13.0
136.0	2.736	2.509	0.227	11.4	12.1
150.0	2.710	2.574	0.136	19.1	19.9
166.0	2.738	2.545	0.193	13.4	14.2
180.0	2.728	2.529	0.199	13.0	13.7
196.0	2.705	2.523	0.182	14.3	14.9
210.0	2.720	2.531	0.189	13.7	14.4
226.0	2.712	2.555	0.157	16.5	17.3
242.0	2.700	2.557	0.143	18.1	18.9
256.0	2.710	2.560	0.150	17.3	18.1
270.0	2.710	2.512	0.198	13.1	13.7
286.0	2.719	2.543	0.176	14.7	15.4
300.0	2.719	2.508	0.211	12.3	12.9
316.0	2.725	2.522	0.203	12.8	13.4
330.0	2.699	2.547	0.152	17.1	17.8
346.0	2.731	2.523	0.208	12.5	13.1
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.720	2.535	0.191	11.4	12.1

Table 19

RSRM-7B FORWARD FIELD JOINT PERFORMANCE

A SAFETY FACTOR OF 2.0 IS REQUIRED

DEGREE LOCATION	PREFIRE (INCHES)	POSTFIRE (INCHES)	MDD	CSF	ASF
2.0	2.746	2.561	0.185	14.0	14.8
16.0	2.756	2.580	0.176	14.7	15.7
30.0	2.785	2.593	0.192	13.5	14.5
46.0	2.775	2.611	0.164	15.8	16.9
60.0	2.771	2.610	0.161	16.1	17.2
76.0	2.744	2.615	0.129	20.1	21.3
90.0	2.723	2.603	0.120	21.6	22.7
106.0	2.741	2.597	0.144	18.0	19.0
120.0	2.731	2.562	0.169	15.4	16.2
136.0	2.769	2.546	0.223	11.6	12.4
150.0	2.765	2.600	0.165	15.7	16.8
166.0	2.764	2.630	0.134	19.4	20.6
180.0	2.743	2.611	0.132	19.7	20.8
196.0	2.745	2.634	0.111	23.4	24.7
210.0	2.720	2.597	0.123	21.1	22.1
226.0	2.724	2.590	0.134	19.4	20.3
242.0	2.747	2.636	0.111	23.4	24.7
256.0	2.745	2.600	0.145	17.9	18.9
270.0	2.730	2.574	0.156	16.6	17.5
286.0	2.724	2.600	0.124	20.9	22.0
300.0	2.725	2.594	0.131	19.8	20.8
316.0	2.743	2.610	0.133	19.5	20.6
330.0	2.727	2.614	0.113	23.0	24.1
346.0	2.731	2.591	0.140	18.5	19.5
	MEDIAN	MEDIAN	MEDIAN	MINIMUM	MINIMUM
	2.743	2.600	0.137	11.6	12.4

Table 20

TABLE 21
RSRM-7B AFT DOME INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
9.3	3.57	5.03	4.10	4.94	3.71	3.28	4.08	4.94	5.29	5.10	4.46	3.93	5.26	4.92	4.28	4.14	3.28	111.6	1.5
10.7	2.77	3.09	2.98	3.51	2.69	2.52	3.07	3.80	3.79	3.57	3.30	3.01	3.40	4.02	3.32	2.91	2.52	111.6	1.5
12.0	2.57	2.57	2.60	3.04	2.32	2.39	2.56	3.86	3.27	2.92	2.70	2.52	2.78	3.13	2.86	2.93	2.32	90.0	1.5
13.1	2.46	2.45	2.54	2.88	2.09	2.34	2.44	4.03	3.19	2.85	2.53	2.23	2.51	2.68	2.68	2.46	2.09	90.0	1.5
14.4	2.37	2.48	2.44	2.95	2.09	2.31	2.51	4.04	3.16	2.88	2.48	2.06	2.40	2.48	2.55	2.32	2.06	248.4	1.5
16.0	2.15	2.34	2.26	3.02	1.99	2.28	2.56	3.98	3.00	3.00	2.43	1.87	2.42	2.36	2.45	2.19	1.87	248.4	1.5
17.3	2.10	2.29	2.28	2.78	1.92	2.19	2.50	3.93	2.91	3.06	2.31	1.84	2.37	2.21	2.29	2.16	1.84	248.4	1.5
18.5	2.21	2.25	2.27	2.75	1.94	2.11	2.65	3.84	2.82	3.15	2.43	2.01	2.36	2.24	2.35	2.16	1.94	90.0	1.5
19.5	2.33	2.30	2.32	2.80	1.99	2.16	2.82	3.88	3.04	3.21	2.63	2.14	2.39	2.38	2.39	2.24	1.99	90.0	1.5
21.3	2.63	2.61	2.57	2.84	2.35	2.49	2.81	3.69	2.79	3.27	3.04	2.32	2.52	2.62	2.50	2.58	2.32	248.4	1.5
24.3	2.60	2.39	2.90	2.54	2.88	3.37	2.32	2.81	2.53	2.30	2.34	2.23	2.42	2.93	2.30	2.53	2.23	248.4	1.5
33.0	2.76	2.52	2.56	2.77	2.97	2.56	2.78	2.71	2.62	2.97	2.97	2.98	2.69	2.70	2.75	2.91	2.52	21.6	1.5
37.0	3.50	3.23	3.56	3.39	3.51	3.62	2.75	2.88	3.65	3.69	3.25	3.75	3.80	3.79	3.57	3.41	2.75	136.8	1.5
40.0	2.96	3.11	2.62	3.33	2.84	3.02	2.42	2.94	2.45	2.63	2.67	2.48	2.66	2.76	2.77	2.77	2.42	136.8	1.5
42.0	2.75	2.92	2.67	2.77	2.42	2.37	2.12	2.58	2.25	2.39	2.29	2.39	2.69	2.39	2.66	2.70	2.12	136.8	1.5
45.0	2.65	2.81	2.65	2.54	2.51	2.35	2.24	2.55	2.32	2.44	2.46	2.61	2.81	2.67	2.78	2.77	2.24	136.8	1.5
48.0	2.92	4.16	4.02	2.97	2.94	2.49	3.44	3.68	2.91	3.29	3.68	3.89	3.75	3.34	3.22	3.20	2.49	111.6	1.5
53.0	4.59	4.64	4.85	5.11	4.03	3.67	4.70	3.84	3.33	3.54	4.32	4.73	4.14	4.08	4.27	3.54	3.33	180.0	1.5

SEGMENT MINIMUM = 1.84 AT THE 17.3 INCH STATION

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
9.3	3.83	5.35	4.45	5.37	4.06	3.49	4.39	5.25	5.71	5.40	4.83	4.22	5.64	5.32	4.62	4.51	3.49	111.6	1.5
10.7	2.99	3.33	3.27	3.83	2.98	2.75	3.35	4.13	4.13	3.93	3.66	3.29	3.76	4.40	3.64	3.18	2.75	111.6	1.5
12.0	2.80	2.81	2.87	3.34	2.55	2.62	2.80	4.24	3.59	3.23	2.99	2.76	3.10	3.44	3.15	3.21	2.55	90.0	1.5
13.1	2.69	2.69	2.81	3.15	2.30	2.54	2.65	4.41	3.50	3.13	2.80	2.45	2.81	2.93	2.96	2.69	2.30	90.0	1.5
14.4	2.51	2.66	2.59	3.15	2.23	2.42	2.66	4.34	3.37	3.08	2.67	2.20	2.62	2.65	2.76	2.47	2.20	248.4	1.5
16.0	2.35	2.56	2.44	3.27	2.17	2.43	2.74	4.35	3.26	3.25	2.64	2.02	2.69	2.56	2.67	2.36	2.02	248.4	1.5
17.3	2.36	2.58	2.54	3.11	2.15	2.43	2.75	4.43	3.24	3.39	2.57	2.04	2.70	2.45	2.57	2.38	2.04	248.4	1.5
18.5	2.53	2.59	2.58	3.14	2.23	2.39	2.96	4.45	3.20	3.55	2.75	2.27	2.74	2.55	2.70	2.44	2.23	90.0	1.5
19.5	2.74	2.71	2.71	3.29	2.35	2.51	3.24	4.61	3.54	3.74	3.04	2.49	2.86	2.80	2.82	2.58	2.35	90.0	1.5
21.3	3.13	3.12	3.05	3.39	2.81	2.92	3.30	4.43	3.30	3.88	3.58	2.71	3.05	3.14	2.97	3.01	2.71	248.4	1.5
24.3	3.07	2.80	3.44	3.03	3.42	3.98	2.72	3.35	2.99	2.66	2.74	2.63	2.87	3.48	2.74	2.95	2.63	248.4	1.5
33.0	3.22	2.97	3.00	3.25	3.40	2.93	3.18	3.09	2.97	3.37	3.34	3.41	3.07	3.12	3.16	3.37	2.93	111.6	1.5
37.0	4.46	4.18	4.53	4.35	4.39	4.46	3.44	3.66	4.51	4.64	4.02	4.72	4.75	4.70	4.43	4.31	3.44	136.8	1.5
40.0	3.41	3.51	3.01	3.80	3.27	3.40	2.76	3.34	2.79	2.96	3.01	2.78	3.04	3.16	3.19	3.19	2.76	136.8	1.5
42.0	3.15	3.32	3.01	3.13	2.75	2.65	2.38	2.91	2.58	2.66	2.55	2.65	3.01	2.74	3.03	3.10	2.38	136.8	1.5
45.0	3.03	3.19	2.99	2.88	2.83	2.62	2.48	2.91	2.59	2.67	2.70	2.91	3.17	2.98	3.14	3.13	2.48	136.8	1.5
48.0	3.53	4.89	4.73	3.56	3.48	2.96	4.02	4.46	3.47	3.86	4.26	4.60	4.47	4.01	3.85	3.82	2.96	111.6	1.5
53.0	4.90	5.06	5.18	5.44	4.30	3.97	5.16	4.29	3.64	3.99	4.67	5.12	4.50	4.47	4.79	3.97	3.64	180.0	1.5

SEGMENT MINIMUM = 2.02 AT THE 16.0 INCH STATION

TABLE 21
RSRM-7B AFT DOME INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MEDIAN	MAX.	DESIGN M+3S
9.3	1.372	0.974	1.195	0.991	1.322	1.496	1.201	0.992	0.926	0.960	1.098	1.248	0.932	0.996	1.145	1.183	1.122	1.496	2.560
10.7	1.694	1.519	1.578	1.339	1.748	1.863	1.533	1.236	1.239	1.317	1.423	1.563	1.384	1.168	1.415	1.615	1.471	1.863	2.261
12.0	1.754	1.753	1.730	1.478	1.939	1.882	1.755	1.165	1.376	1.540	1.667	1.788	1.620	1.437	1.576	1.538	1.643	1.939	2.208
13.1	1.749	1.754	1.691	1.494	2.053	1.836	1.762	1.068	1.347	1.509	1.702	1.926	1.711	1.606	1.604	1.750	1.707	2.053	2.218
14.4	1.727	1.653	1.680	1.389	1.960	1.777	1.632	1.015	1.299	1.425	1.651	1.991	1.707	1.653	1.608	1.765	1.653	1.991	2.225
16.0	1.755	1.617	1.673	1.252	1.897	1.655	1.475	0.949	1.260	1.259	1.558	2.023<	1.559	1.600	1.546	1.729	1.580	2.023	1.980
17.3	1.697<	1.553	1.560	1.280	1.853<	1.624	1.423	0.906	1.225	1.162	1.540	1.937<	1.502	1.614	1.553	1.651	1.553	1.937	1.675
18.5	1.523<	1.495	1.479	1.222	1.728<	1.589<	1.267	0.876	1.191	1.068	1.382	1.675<	1.421	1.503<	1.427	1.555<	1.453	1.728	1.496
19.5	1.352	1.367	1.355	1.127	1.581	1.457	1.118	0.811	1.037	0.982	1.200	1.474	1.316	1.323	1.316	1.406	1.319	1.581	1.617
21.3	1.120	1.127	1.142	1.036	1.253	1.181	1.046	0.796	1.054	0.899	0.967	1.267	1.167	1.122	1.176	1.140	1.124	1.267	1.654
24.3	1.130	1.232	1.015	1.159	1.022	0.872	1.269	1.047	1.161	1.279	1.258	1.321	1.217	1.005	1.279	1.161	1.161	1.321	1.832
33.0	1.160	1.272	1.249	1.155	1.077	1.250	1.152	1.182	1.223	1.079	1.079	1.075	1.190	1.185	1.165	1.100	1.163	1.272	1.399
37.0	0.743	0.804	0.730	0.766	0.741	0.719	0.945	0.902	0.713	0.705	0.799	0.693	0.685	0.686	0.728	0.763	0.735	0.945	1.356
40.0	0.878	0.836	0.992	0.780	0.914	0.862	1.073	0.883	1.062	0.990	0.972	1.048	0.979	0.943	0.940	0.939	0.941	1.073	1.324
42.0	0.946	0.890	0.974	0.939	1.074	1.099	1.224	1.006	1.153	1.090	1.136	1.086	0.968	1.090	0.979	0.964	1.040	1.224	1.311
45.0	0.980	0.925	0.980	1.022	1.035	1.106	1.162	1.020	1.122	1.064	1.056	0.995	0.924	0.973	0.936	0.937	1.008	1.162	1.222
48.0	0.889	0.625	0.647	0.875	0.885	1.043	0.755	0.706	0.892	0.790	0.707	0.668	0.694	0.778	0.807	0.813	0.784	1.043	1.155
53.0	0.737	0.729	0.697	0.662	0.839	0.920	0.719	0.881	1.015	0.954	0.783	0.715	0.816	0.828	0.791	0.956	0.803	1.015	1.305

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	AVE.	EXPOSURE TIME
9.3	11.2	8.0	9.8	8.1	10.8	12.3	9.8	8.1	7.6	7.9	9.0	10.2	7.6	8.2	9.4	9.7	9.2	122.1
10.7	14.1	12.7	13.2	11.2	14.6	15.5	12.8	10.3	10.3	11.0	11.9	13.0	11.5	9.7	11.8	13.5	12.3	119.9
12.0	15.0	15.0	14.8	12.6	16.6	16.1	15.0	10.0	11.8	13.2	14.3	15.3	13.9	12.3	13.5	13.2	13.9	116.9
13.1	15.3	15.4	14.8	13.1	18.0	16.1	15.4	9.4	11.8	13.2	14.9	16.9	15.0	14.1	14.1	15.3	14.5	114.1
14.4	15.5	14.9	15.1	12.5	17.6	16.0	14.7	9.1	11.7	12.8	14.8	17.9	15.3	14.9	14.4	15.9	14.6	111.3
16.0	16.2	14.9	15.4	11.6	17.5	15.3	13.6	8.8	11.6	11.6	14.4	18.7	14.4	14.8	14.3	16.0	14.3	108.3
17.3	16.1	14.7	14.8	12.2	17.6	15.4	13.5	8.6	11.6	11.0	14.6	18.4	14.3	15.3	14.7	15.7	14.3	105.3
18.5	14.8	14.5	14.3	11.9	16.8	15.4	12.3	8.5	11.6	10.4	13.4	16.2	13.8	14.6	13.8	15.1	13.6	103.1
19.5	13.4	13.5	13.4	11.1	15.6	14.4	11.0	8.0	10.2	9.7	11.9	14.6	13.0	13.1	13.0	13.9	12.5	101.2
21.3	11.5	11.5	11.7	10.6	12.8	12.1	10.7	8.1	10.8	9.2	9.9	13.0	11.9	11.5	12.0	11.7	11.2	97.8
24.3	12.0	13.1	10.8	12.4	10.9	9.3	13.5	11.2	12.4	13.6	13.4	14.1	13.0	10.7	13.6	12.4	12.3	93.8
33.0	13.9	15.2	14.9	13.8	12.9	15.0	13.8	14.1	14.6	12.9	12.9	12.9	14.2	14.2	13.9	13.2	13.9	83.6
37.0	9.4	10.2	9.2	9.7	9.4	9.1	11.9	11.4	9.0	8.9	10.1	8.7	8.6	8.7	9.2	9.6	9.6	79.2
40.0	11.3	10.8	12.8	10.1	11.8	11.1	13.9	11.4	13.7	12.8	12.6	13.5	12.6	12.2	12.1	12.1	12.2	77.4
42.0	12.4	11.6	12.7	12.3	14.1	14.4	16.0	13.2	15.1	14.3	14.9	14.2	12.7	14.3	12.8	12.6	13.6	76.4
45.0	13.1	12.3	13.1	13.6	13.8	14.7	15.5	13.6	15.0	14.2	14.1	13.3	12.3	13.0	12.5	12.5	13.5	75.0
48.0	12.5	8.8	9.1	12.3	12.4	14.6	10.6	9.9	12.5	11.1	9.9	9.4	9.7	10.9	11.3	11.4	11.0	71.2
53.0	9.9	9.8	9.3	8.9	11.2	12.3	9.6	11.8	13.6	12.8	10.5	9.6	10.9	11.1	10.6	12.8	10.9	74.6

MOTOR ACTION TIME = 122.9 SECONDS

TABLE 21
RSRM-7B AFT DOME INSULATION PERFORMANCE

PART NO. 1U76668-03
SERIAL NO. 0000006

PREFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN	MDT
9.3	5.252	5.214	5.314	5.324	5.371	5.219	5.278	5.211	5.288	5.185	5.303	5.267	5.260	5.297	5.293	5.331	5.185	5.283	4.900
10.7	5.069	5.056	5.160	5.125	5.208	5.123	5.133	5.103	5.111	5.171	5.203	5.139	5.200	5.138	5.150	5.137	5.056	5.138	4.700
12.0	4.919	4.930	4.961	4.940	4.953	4.925	4.907	4.935	4.943	4.979	4.987	4.940	5.027	4.942	4.967	4.932	4.907	4.941	4.500
13.1	4.697	4.710	4.744	4.712	4.715	4.662	4.677	4.714	4.709	4.727	4.769	4.720	4.816	4.705	4.751	4.713	4.662	4.714	4.300
14.4	4.331	4.392	4.356	4.382	4.374	4.308	4.335	4.403	4.378	4.383	4.403	4.382	4.472	4.373	4.436	4.362	4.308	4.380	4.100
16.0	4.117	4.142	4.085	4.097	4.112	4.028	4.046	4.125	4.107	4.098	4.106	4.090	4.191	4.089	4.131	4.074	4.028	4.102	3.780
17.3	4.004	4.000	3.968	3.985	3.987	3.952	3.916	4.014	3.965	3.943	3.963	3.949	4.049	3.962	3.997	3.926	3.916	3.967	3.560
18.5	3.854	3.865	3.813	3.832	3.856	3.799	3.751	3.898	3.813	3.793	3.805	3.810	3.898	3.840	3.852	3.789	3.751	3.822	3.360
19.5	3.708	3.703	3.672	3.710	3.718	3.651	3.620	3.735	3.669	3.672	3.649	3.672	3.766	3.710	3.713	3.632	3.620	3.688	3.150
21.3	3.501	3.518	3.479	3.516	3.522	3.454	3.452	3.529	3.475	3.492	3.462	3.438	3.562	3.521	3.496	3.433	3.433	3.494	2.940
24.3	3.468	3.448	3.488	3.512	3.500	3.469	3.446	3.508	3.472	3.404	3.447	3.473	3.489	3.495	3.509	3.427	3.404	3.473	2.940
33.0	3.731	3.780	3.753	3.757	3.667	3.661	3.664	3.655	3.628	3.641	3.604	3.663	3.654	3.701	3.676	3.706	3.604	3.666	3.200
37.0	3.317	3.361	3.306	3.330	3.256	3.210	3.255	3.301	3.217	3.268	3.208	3.268	3.251	3.224	3.225	3.286	3.208	3.262	2.600
40.0	2.998	2.938	2.989	2.963	2.993	2.928	2.957	2.945	2.964	2.931	2.928	2.912	2.978	2.978	3.001	2.999	2.912	2.964	2.600
42.0	2.979	2.952	2.932	2.937	2.949	2.907	2.908	2.925	2.975	2.904	2.899	2.876	2.909	2.991	2.965	2.987	2.876	2.934	2.600
45.0	2.970	2.948	2.926	2.948	2.929	2.894	2.876	2.969	2.905	2.837	2.852	2.898	2.928	2.904	2.936	2.936	2.837	2.927	2.600
48.0	3.140	3.059	3.059	3.119	3.082	3.084	3.034	3.152	3.094	3.051	3.011	3.075	3.099	3.119	3.104	3.104	3.011	3.089	2.600
53.0	3.610	3.688	3.610	3.602	3.609	3.657	3.711	3.782	3.698	3.805	3.658	3.663	3.672	3.698	3.791	3.791	3.602	3.680	3.380

PART NO. 1U76658-01
SERIAL NO. 0000002

POSTFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN
9.3	3.880	4.240	4.119	4.333	4.049	3.723	4.077	4.219	4.362	4.225	4.205	4.019	4.328	4.301	4.148	4.148	3.723	4.176
10.7	3.375	3.537	3.582	3.786	3.460	3.260	3.600	3.867	3.872	3.854	3.780	3.576	3.816	3.970	3.735	3.522	3.260	3.668
12.0	3.165	3.177	3.231	3.462	3.014	3.043	3.152	3.770	3.567	3.439	3.320	3.152	3.407	3.505	3.391	3.394	3.014	3.355
13.1	2.948	2.956	3.053	3.218	2.662	2.826	2.915	3.646	3.362	3.218	3.067	2.794	3.105	3.099	3.147	2.963	2.662	3.060
14.4	2.604	2.739	2.676	2.993	2.414	2.531	2.703	3.388	3.079	2.958	2.752	2.391	2.765	2.720	2.828	2.597	2.391	2.730
16.0	2.362	2.525	2.412	2.845	2.215	2.373	2.571	3.176	2.847	2.839	2.548	2.067	2.632	2.489	2.585	2.345	2.067	2.537
17.3	2.307	2.447	2.408	2.705	2.134	2.328	2.493	3.108	2.740	2.781	2.423	2.012	2.547	2.348	2.444	2.275	2.012	2.434
18.5	2.331	2.370	2.334	2.610	2.128	2.210	2.484	3.022	2.622	2.725	2.423	2.135	2.477	2.337	2.425	2.234	2.128	2.397
19.5	2.356	2.336	2.317	2.583	2.137	2.194	2.502	2.924	2.632	2.690	2.449	2.198	2.450	2.387	2.397	2.226	2.137	2.392
21.3	2.381	2.391	2.337	2.480	2.269	2.273	2.406	2.733	2.421	2.593	2.495	2.171	2.395	2.399	2.320	2.293	2.171	2.393
24.3	2.338	2.216	2.473	2.353	2.478	2.597	2.177	2.461	2.311	2.125	2.189	2.152	2.272	2.490	2.230	2.266	2.125	2.292
33.0	2.571	2.508	2.504	2.602	2.590	2.411	2.512	2.473	2.405	2.562	2.525	2.588	2.464	2.516	2.511	2.606	2.405	2.514
37.0	2.574	2.557	2.576	2.564	2.515	2.491	2.310	2.399	2.504	2.563	2.409	2.575	2.566	2.538	2.497	2.523	2.310	2.531
40.0	2.120	2.102	1.997	2.183	2.079	2.066	1.884	2.062	1.902	1.941	1.956	1.864	1.999	2.035	2.061	2.060	1.864	2.048
42.0	2.033	2.062	1.958	1.998	1.875	1.808	1.684	1.919	1.822	1.814	1.763	1.790	1.941	1.901	1.986	2.023	1.684	1.910
45.0	1.990	2.023	1.946	1.926	1.894	1.788	1.714	1.949	1.783	1.773	1.796	1.903	2.004	1.931	2.000	1.999	1.714	1.929
48.0	2.251	2.434	2.412	2.244	2.197	2.041	2.279	2.446	2.202	2.261	2.304	2.407	2.405	2.341	2.297	2.291	2.041	2.294
53.0	2.873	2.959	2.913	2.940	2.770	2.737	2.992	2.901	2.683	2.851	2.875	2.948	2.856	2.870	3.000	2.835	2.683	2.874

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
56.0	3.46	3.79	3.37	4.53	3.96	3.13	4.82	3.53	2.93	3.65	5.30	4.39	3.50	3.71	4.19	3.46	2.93	180.0	2.0
72.0	3.82	3.80	4.01	4.02	4.81	4.08	5.78	4.66	3.58	5.25	4.20	3.78	4.08	3.94	5.14	5.22	3.58	180.0	1.5
75.0	3.59	3.49	4.44	3.47	4.50	3.77	4.09	4.26	3.55	5.50	3.99	4.21	3.80	4.05	4.09	5.34	3.47	68.4	1.5
78.0	3.10	3.41	3.40	2.74	3.99	3.33	3.13	3.86	3.02	4.03	3.94	3.26	3.54	3.88	4.20	8.51	2.74	68.4	1.5
81.0	3.19	3.31	3.59	4.22	4.38	3.12	3.54	3.95	3.02	3.76	4.11	3.22	3.53	3.64	3.63	7.87	3.02	180.0	1.5
85.0	2.74	2.90	3.32	3.19	4.29	3.16	3.20	3.23	3.03	3.00	3.39	3.15	3.27	3.83	3.29	6.77	2.74	0.0	1.5
90.0	2.70	2.61	3.51	3.18	2.98	2.71	2.94	3.80	2.89	3.14	3.10	2.76	3.06	3.56	3.19	4.22	2.61	21.6	1.5
98.0	2.07	2.57	2.73	2.37	2.81	2.40	2.29	2.47	2.28	2.60	2.53	2.93	2.70	2.37	2.59	4.11	2.07	0.0	1.5
105.8	2.45		2.49		2.96		2.22		2.36		2.45		2.69		2.51		2.22	136.8	1.5
116.0	2.46		2.83		5.00		2.58		2.79		2.41		2.91		2.55		2.41	226.8	1.5
124.5	2.45		2.44		3.29		2.43		4.07		2.29		2.51		2.40		2.29	226.8	1.5
133.0	2.30		2.60		2.81		2.37		3.71		2.28		2.41		2.13		2.13	316.8	1.5
145.5	2.11		2.29		2.08		2.27		2.21		2.22		2.32		2.04		2.04	316.8	1.5
158.5	2.39		2.45		2.24		2.36		2.36		2.37		2.29		2.24		2.24	90.0	1.5
168.3	3.00		2.89		3.05		2.66		3.23		2.73		3.53		2.91		2.66	136.8	1.5
177.7	2.38		2.47		2.34		2.36		2.36		2.67		2.73		2.38		2.34	90.0	2.0
192.5	3.16		2.95		3.56		2.83		4.13		2.68		5.65		2.48		2.48	316.8	1.5
202.5	3.02		2.48		2.66		2.91		2.45		2.53		2.83		2.79		2.45	180.0	1.5
214.0	2.89		2.60		2.35		2.43		2.45		2.55		2.60		2.33		2.33	316.8	1.5
227.3	3.11		4.11		3.48		2.65		2.81		2.79		2.94		2.93		2.65	136.8	1.5
238.3	2.30		2.96		2.57		2.99		2.68		2.86		2.97		2.64		2.30	0.0	1.5
250.0	2.84		2.38		2.84		2.81		2.44		2.31		2.57		2.47		2.31	226.8	1.5
267.0	2.89		4.17		2.65		3.40		2.65		2.35		2.40		2.46		2.35	226.8	1.5
283.9	3.10		2.50		2.83		2.85		2.60		3.04		2.60		2.65		2.50	46.8	1.5
299.1	3.12		3.23		2.85		3.61		3.10		3.19		3.05		3.20		2.85	90.0	2.0
322.0	3.52		3.04		3.28		3.19		2.99		2.88		3.39		3.25		2.88	226.8	1.5
339.0	3.49		3.80		4.09		4.18		4.13		3.25		3.49		2.50		2.50	316.8	1.5
344.0	5.43		4.37		9.50		6.23		5.94		5.35		9.27		10.56		4.37	46.8	1.5
358.0	6.44		4.09		3.88		4.87		3.14		4.87		5.00		3.92		3.14	180.0	1.5
363.0	8.84		21.11		6.79		6.03		12.67		10.86		9.27		5.59		5.59	316.8	1.5
367.0	10.00		5.67		+		18.10		7.45		8.26		5.59		9.27		5.59	270.0	1.5
372.0	+		14.81		9.76		+		8.16		8.70		10.53		5.13		5.13	316.8	1.5
375.0	60.00		8.73		9.80		13.71		11.43		10.91		8.57		5.78		5.78	316.8	1.5
377.5	+		+		+		+		7.91		+		+		15.59		7.91	180.0	1.5

SEGMENT MINIMUM = 2.04 AT THE 145.5 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	PLANE	REQUIRED S.F.
56.0	4.20	4.61	4.21	5.47	4.77	3.86	5.80	4.37	3.66	4.58	6.31	5.34	4.34	4.56	5.18	4.28	3.66	180.0	2.0
72.0	4.18	4.09	4.35	4.30	5.12	4.34	6.21	4.90	3.76	5.53	4.40	4.00	4.30	4.33	5.67	5.75	3.76	180.0	1.5
75.0	3.94	3.82	4.86	3.79	5.05	4.05	4.54	4.61	3.83	5.97	4.32	4.57	4.10	4.43	4.72	6.17	3.79	68.4	1.5
78.0	3.45	3.68	3.83	2.98	4.45	3.61	3.52	4.24	3.28	4.52	4.24	3.56	3.86	4.29	4.79	9.33	2.98	68.4	1.5
81.0	3.55	3.63	4.06	4.59	5.01	3.46	3.85	4.32	3.26	4.08	4.39	3.48	3.83	4.11	3.98	8.79	3.26	180.0	1.5
85.0	3.50	3.49	4.11	3.97	5.26	3.86	3.86	3.90	3.59	3.60	4.07	3.78	3.96	4.68	3.94	8.34	3.49	21.6	1.5
90.0	3.16	3.01	3.90	3.77	3.43	3.11	3.35	4.28	3.21	3.44	3.42	3.14	3.46	4.01	3.60	4.85	3.01	21.6	1.5
98.0	2.71	3.18	3.45	3.05	3.60	3.07	2.89	3.13	2.89	3.25	3.15	3.82	3.45	3.00	3.24	5.37	2.71	0.0	1.5
105.8	2.61		2.60		3.11		2.30		2.45		2.50		2.80		2.60		2.30	136.8	1.5
116.0	2.57		2.85		5.11		2.65		2.80		2.47		3.01		2.62		2.47	226.8	1.5
124.5	2.55		2.53		3.44		2.47		4.09		2.41		2.66		2.49		2.41	226.8	1.5
133.0	2.70		2.91		3.15		2.73		4.36		2.66		2.87		2.53		2.53	316.8	1.5
145.5	2.11		2.29		2.09		2.27		2.23		2.26		2.32		2.04		2.04	316.8	1.5
158.5	2.45		2.45		2.30		2.36		2.36		2.46		2.38		2.29		2.29	316.8	1.5
168.3	3.72		3.54		3.67		3.18		3.84		3.22		4.12		3.60		3.18	136.8	1.5
177.7	3.75		3.81		3.65		3.60		3.61		4.07		4.19		3.63		3.60	136.8	2.0
192.5	3.69		3.40		4.08		3.30		4.69		3.05		6.51		2.95		2.95	316.8	1.5
202.5	3.07		2.52		2.69		2.92		2.47		2.57		2.85		2.81		2.47	180.0	1.5
214.0	2.95		2.66		2.40		2.44		2.46		2.56		2.67		2.42		2.40	90.0	1.5
227.3	3.64		4.87		4.17		3.24		3.42		3.33		3.53		3.47		3.24	136.8	1.5
238.3	2.32		3.04		2.64		2.99		2.70		2.90		3.00		2.68		2.32	0.0	1.5
250.0	2.90		2.43		2.84		2.85		2.48		2.34		2.59		2.53		2.34	226.8	1.5
267.0	2.91		4.31		2.68		3.44		2.71		2.42		2.41		2.53		2.41	270.0	1.5
283.9	3.52		2.83		3.15		3.15		2.79		3.24		2.84		2.99		2.79	180.0	1.5
299.1	4.92		5.16		4.53		5.68		4.89		5.02		4.77		5.10		4.53	90.0	2.0
322.0	3.95		3.40		3.56		3.45		3.13		3.11		3.59		3.67		3.11	226.8	1.5
339.0	3.96		4.21		4.38		4.47		4.36		3.55		3.70		2.81		2.81	316.8	1.5
344.0	6.13		5.00		10.65		7.07		6.63		5.80		10.34		11.81		5.00	46.8	1.5
358.0	7.93		4.84		4.54		5.90		3.88		5.90		5.92		4.61		3.88	180.0	1.5
363.0	10.26		23.89		7.82		6.95		13.70		12.46		10.49		6.26		6.26	316.8	1.5
367.0	12.18		6.90		+		21.33		8.82		9.91		6.62		11.20		6.62	270.0	1.5
372.0	+		15.85		10.15		+		8.51		9.00		10.92		5.45		5.45	316.8	1.5
375.0	66.50		9.60		10.59		14.63		12.45		11.70		9.66		6.37		6.37	316.8	1.5
377.5	+		+		+		+		9.54		+		+		17.09		9.54	180.0	1.5

SEGMENT MINIMUM = 2.04 AT THE 145.5 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MEDIAN	MAX.	DESIGN M+3S
56.0	0.807	0.736	0.828	0.616	0.705	0.892	0.579	0.791	0.951	0.764	0.526	0.636	0.798	0.752	0.666	0.807	0.758	0.951	1.369
72.0	0.523	0.527	0.499	0.498	0.416	0.490	0.346	0.429	0.558	0.381	0.476	0.529	0.490	0.508	0.389	0.383	0.490	0.558	0.817
75.0	0.502	0.516	0.405	0.518	0.400	0.477	0.440	0.423	0.507	0.327	0.451	0.428	0.474	0.444	0.440	0.337	0.442	0.518	0.773
78.0	0.516	0.469	0.471	0.585	0.401	0.480	0.511	0.414	0.530	0.397	0.406	0.491	0.452	0.412	0.381	0.188	0.461	0.585	0.718
81.0	0.439	0.423	0.390	0.332	0.320	0.449	0.396	0.354	0.463	0.372	0.341	0.435	0.397	0.385	0.386	0.178	0.388	0.463	0.688
85.0	0.474	0.448	0.391	0.408	0.303	0.412	0.406	0.403	0.429	0.434	0.384	0.413	0.398	0.339	0.395	0.192	0.405	0.474	0.618
90.0	0.469	0.484	0.360	0.398	0.424	0.466	0.430	0.333	0.437	0.403	0.408	0.458	0.414	0.355	0.396	0.300	0.411	0.484	0.576
98.0	0.547	0.442	0.416	0.479	0.404	0.473	0.495	0.460	0.498	0.436	0.448	0.388	0.421	0.479	0.439	0.276	0.445	0.547	0.582
105.8	0.440		0.434		0.365		0.487		0.458		0.441		0.401		0.431		0.437	0.487	0.559
116.0	0.426		0.371		0.210		0.407		0.377		0.436		0.361		0.412		0.392	0.436	0.527
124.5	0.420		0.422		0.313		0.423		0.253		0.449		0.411		0.430		0.421	0.449	0.522
133.0	0.426		0.377		0.349		0.414		0.264		0.429		0.407		0.460		0.410	0.460	0.516
145.5	0.441		0.406		0.447		0.410		0.421		0.418		0.401		0.456		0.420	0.456	0.493
158.5	0.368		0.359		0.393		0.373		0.373		0.371		0.385		0.392		0.373	0.393	0.491
168.3	0.283		0.294		0.279		0.319		0.263		0.311		0.241		0.292		0.288	0.319	0.459
177.7	0.420		0.405		0.428		0.423		0.423		0.375		0.366		0.420		0.420	0.428	0.452
192.5	0.247		0.264		0.219		0.276		0.189		0.291		0.138		0.314		0.255	0.314	0.400
202.5	0.242		0.294		0.274		0.251		0.298		0.288		0.258		0.262		0.268	0.298	0.376
214.0	0.242		0.269		0.298		0.288		0.286		0.274		0.269		0.300		0.280	0.300	0.351
227.3	0.209		0.158		0.187		0.245		0.231		0.233		0.221		0.222		0.221	0.245	0.317
238.3	0.274		0.213		0.245		0.211		0.235		0.220		0.212		0.239		0.228	0.274	0.331
250.0	0.194		0.231		0.194		0.196		0.225		0.238		0.214		0.223		0.219	0.238	0.285
267.0	0.173		0.120		0.189		0.147		0.189		0.213		0.208		0.203		0.189	0.213	0.303
283.9	0.145		0.180		0.159		0.158		0.173		0.148		0.173		0.170		0.164	0.180	0.251
299.1	0.217		0.209		0.237		0.187		0.218		0.212		0.222		0.211		0.215	0.237	0.253
322.0	0.108		0.125		0.116		0.119		0.127		0.132		0.112		0.117		0.118	0.132	0.197
339.0	0.109		0.100		0.093		0.091		0.092		0.117		0.109		0.152		0.104	0.152	0.190
344.0	0.070		0.087		0.040		0.061		0.064		0.071		0.041		0.036		0.062	0.087	0.187
358.0	0.059		0.093		0.098		0.078		0.121		0.078		0.076		0.097		0.086	0.121	0.181
363.0	0.043		0.018		0.056		0.063		0.030		0.035		0.041		0.068		0.042	0.068	0.179
367.0	0.038		0.067		0		0.021		0.051		0.046		0.068		0.041		0.043	0.068	0.175
372.0	0		0.027		0.041		0.002		0.049		0.046		0.038		0.078		0.039	0.078	0.226
375.0	0.008		0.055		0.049		0.035		0.042		0.044		0.056		0.083		0.046	0.083	0.237
377.5	0		0		0		0		0.067		0		0		0.034		0	0.067	0.237

A

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	AVE.	EXPOSURE TIME
56.0	10.8	9.9	11.1	8.3	9.5	12.0	7.8	10.6	12.8	10.3	7.1	8.5	10.7	10.1	9.0	10.8	10.0	74.4
72.0	9.3	9.3	8.8	8.8	7.4	8.7	6.1	7.6	9.9	6.7	8.4	9.4	8.7	9.0	6.9	6.8	8.2	56.5
75.0	9.9	10.2	8.0	10.2	7.9	9.4	8.7	8.3	10.0	6.4	8.9	8.4	9.3	8.8	8.7	6.6	8.7	50.7
78.0	11.1	10.1	10.1	12.6	8.6	10.3	11.0	8.9	11.4	8.5	8.7	10.6	9.7	8.9	8.2	4.0	9.5	46.5
81.0	9.6	9.3	8.5	7.3	7.0	9.8	8.7	7.7	10.1	8.1	7.5	9.5	8.7	8.4	8.4	3.9	8.3	45.7
85.0	10.5	9.9	8.7	9.0	6.7	9.1	9.0	8.9	9.5	9.6	8.5	9.2	8.8	7.5	8.8	4.3	8.6	45.1
90.0	10.5	10.9	8.1	8.9	9.5	10.5	9.7	7.5	9.8	9.1	9.2	10.3	9.3	8.0	8.9	6.7	9.2	44.5
98.0	12.6	10.2	9.6	11.0	9.3	10.9	11.4	10.6	11.4	10.0	10.3	8.9	9.7	11.0	10.1	6.3	10.2	43.5
105.8	10.3		10.2		8.5		11.4		10.7		10.3		9.4		10.1		10.1	42.7
116.0	10.2		8.9		5.0		9.7		9.0		10.4		8.6		9.8		8.9	41.9
124.5	10.3		10.3		7.7		10.3		6.2		11.0		10.0		10.5		9.5	40.9
133.0	10.7		9.5		8.8		10.4		6.6		10.8		10.3		11.6		9.8	39.7
145.5	11.7		10.8		11.9		10.9		11.2		11.1		10.6		12.1		11.3	37.7
158.5	10.2		9.9		10.9		10.3		10.3		10.3		10.7		10.9		10.4	36.1
168.3	8.2		8.5		8.0		9.2		7.6		9.0		6.9		8.4		8.2	34.7
177.7	12.2		11.8		12.5		12.3		12.3		10.9		10.7		12.2		11.9	34.3
192.5	7.9		8.5		7.0		8.9		6.1		9.4		4.4		10.1		7.8	31.1
202.5	8.1		9.9		9.2		8.5		10.0		9.7		8.7		8.8		9.1	29.7
214.0	8.7		9.6		10.7		10.3		10.3		9.8		9.6		10.8		10.0	27.9
227.3	8.1		6.1		7.2		9.5		8.9		9.0		8.5		8.6		8.2	25.9
238.3	11.3		8.8		10.1		8.7		9.7		9.1		8.7		9.8		9.5	24.3
250.0	8.5		10.2		8.5		8.6		9.9		10.5		9.4		9.8		9.4	22.7
267.0	8.7		6.1		9.5		7.4		9.5		10.8		10.5		10.3		9.1	19.8
283.9	8.5		10.6		9.4		9.3		10.2		8.7		10.2		10.0		9.6	17.0
299.1	12.3		11.9		13.5		10.6		12.4		12.0		12.6		12.0		12.2	17.6
322.0	8.4		9.8		9.1		9.3		9.9		10.3		8.8		9.1		9.3	12.8
339.0	8.9		8.2		7.6		7.5		7.5		9.6		8.9		12.5		8.8	12.2
344.0	5.7		7.1		3.3		5.0		5.2		5.8		3.4		3.0		4.8	12.2
358.0	5.2		8.2		8.6		6.8		10.6		6.8		6.7		8.5		7.7	11.4
363.0	3.8		1.6		4.9		5.5		2.6		3.1		3.6		6.0		3.9	11.4
367.0	3.5		6.1		0		1.9		4.6		4.2		6.2		3.7		3.8	11.0
372.0	0		1.7		2.6		0.1		3.1		2.9		2.4		4.9		2.2	15.8
375.0	0.4		2.9		2.6		1.8		2.2		2.3		2.9		4.3		2.4	19.2
377.5	0		0		0		0		3.3		0		0		1.7		0.6	20.4

MOTOR ACTION TIME = 122.9 SECONDS

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

PART NO. 1U76668-03
SERIAL NO. 0000006

PREFIRE MEASUREMENTS
INCHES

STATION	DEGREE LOCATIONS																		
(IN)	0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN	MDT
56.0	3.386	3.390	3.482	3.367	3.366	3.440	3.359	3.453	3.481	3.498	3.317	3.398	3.462	3.428	3.451	3.451	3.317	3.434	2.790
72.0	2.185	2.153	2.171	2.143	2.128	2.126	2.149	2.104	2.098	2.107	2.096	2.116	2.106	2.198	2.204	2.204	2.096	2.135	2.000
75.0	1.978	1.969	1.968	1.964	2.019	1.932	1.998	1.948	1.942	1.952	1.949	1.958	1.945	1.968	2.078	2.078	1.932	1.966	1.800
78.0	1.781	1.728	1.806	1.742	1.786	1.733	1.800	1.756	1.740	1.793	1.721	1.746	1.745	1.768	1.825	1.754	1.721	1.755	1.600
81.0	1.559	1.536	1.582	1.524	1.604	1.552	1.526	1.528	1.510	1.516	1.498	1.514	1.521	1.582	1.536	1.565	1.498	1.532	1.400
85.0	1.661	1.564	1.606	1.619	1.595	1.591	1.568	1.573	1.541	1.564	1.562	1.563	1.578	1.585	1.556	1.602	1.541	1.576	1.300
90.0	1.483	1.455	1.403	1.499	1.454	1.450	1.441	1.425	1.401	1.386	1.394	1.437	1.433	1.425	1.425	1.454	1.386	1.435	1.265
98.0	1.485	1.405	1.437	1.463	1.453	1.454	1.429	1.439	1.438	1.418	1.413	1.481	1.451	1.438	1.422	1.483	1.405	1.439	1.135
105.8	1.150		1.128		1.136		1.121		1.121		1.103		1.121		1.120		1.103	1.121	1.080
116.0	1.096		1.057		1.074		1.080		1.054		1.075		1.086		1.078		1.054	1.077	1.050
124.5	1.071		1.069		1.078		1.046		1.036		1.082		1.092		1.071		1.036	1.071	1.030
133.0	1.150		1.098		1.098		1.132		1.150		1.140		1.168		1.165		1.098	1.145	0.980
145.5	0.930		0.930		0.932		0.931		0.938		0.943		0.932		0.931		0.930	0.932	0.930
158.5	0.903		0.881		0.905		0.882		0.880		0.911		0.916		0.898		0.880	0.900	0.880
168.3	1.052		1.040		1.023		1.013		1.010		1.000		0.992		1.052		0.992	1.018	0.850
177.7	1.575		1.544		1.563		1.524		1.527		1.525		1.534		1.523		1.523	1.531	1.000
192.5	0.912		0.898		0.894		0.911		0.887		0.887		0.898		0.927		0.887	0.898	0.780
202.5	0.742		0.742		0.738		0.732		0.736		0.739		0.735		0.737		0.732	0.738	0.730
214.0	0.715		0.715		0.714		0.704		0.704		0.701		0.717		0.727		0.701	0.715	0.700
227.3	0.760		0.769		0.779		0.793		0.790		0.777		0.780		0.770		0.760	0.778	0.650
238.3	0.635		0.647		0.646		0.631		0.634		0.639		0.636		0.640		0.631	0.637	0.630
250.0	0.562		0.561		0.551		0.558		0.558		0.556		0.555		0.565		0.551	0.558	0.550
267.0	0.504		0.517		0.506		0.505		0.512		0.515		0.502		0.513		0.502	0.509	0.500
283.9	0.510		0.510		0.501		0.498		0.483		0.480		0.492		0.508		0.480	0.500	0.450
299.1	1.067		1.078		1.074		1.062		1.066		1.065		1.059		1.076		1.059	1.067	0.676
322.0	0.427		0.425		0.413		0.411		0.398		0.411		0.402		0.429		0.398	0.412	0.380
339.0	0.432		0.421		0.407		0.407		0.401		0.415		0.403		0.427		0.401	0.411	0.380
344.0	0.429		0.435		0.426		0.431		0.424		0.412		0.424		0.425		0.412	0.426	0.380
358.0	0.468		0.450		0.445		0.460		0.470		0.460		0.450		0.447		0.445	0.455	0.380
363.0	0.441		0.430		0.438		0.438		0.411		0.436		0.430		0.426		0.411	0.433	0.380
367.0	0.463		0.462		0.430		0.448		0.450		0.456		0.450		0.459		0.430	0.453	0.380
372.0	0.425		0.428		0.416		0.413		0.417		0.414		0.415		0.425		0.413	0.417	0.400
375.0	0.532		0.528		0.519		0.512		0.523		0.515		0.541		0.529		0.512	0.525	0.480
377.5	0.641		0.651		0.631		0.604		0.639		0.650		0.589		0.581		0.581	0.635	0.530

TABLE 22
RSRM-7B AFT CYLINDER INSULATION PERFORMANCE

PART NO. 1U76658-01
SERIAL NO. 0000002

POSTFIRE MEASUREMENTS
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	21.6	46.8	68.4	90.0	111.6	136.8	158.4	180.0	201.6	226.8	248.4	270.0	291.6	316.8	338.4	MIN.	MEDIAN
56.0	2.579	2.654	2.654	2.751	2.661	2.548	2.780	2.662	2.530	2.734	2.791	2.762	2.664	2.676	2.785	2.644	2.530	2.663
72.0	1.662	1.626	1.672	1.645	1.712	1.636	1.803	1.675	1.540	1.726	1.620	1.587	1.616	1.690	1.815	1.821	1.540	1.667
75.0	1.476	1.453	1.563	1.446	1.619	1.455	1.558	1.525	1.435	1.625	1.498	1.530	1.471	1.524	1.638	1.741	1.435	1.525
78.0	1.265	1.259	1.335	1.157	1.385	1.253	1.289	1.342	1.210	1.396	1.315	1.255	1.293	1.356	1.444	1.566	1.157	1.304
81.0	1.120	1.113	1.192	1.192	1.284	1.103	1.130	1.174	1.047	1.144	1.157	1.079	1.124	1.197	1.150	1.387	1.047	1.147
85.0	1.187	1.116	1.215	1.211	1.292	1.179	1.162	1.170	1.112	1.130	1.178	1.150	1.180	1.246	1.161	1.410	1.112	1.179
90.0	1.014	0.971	1.043	1.101	1.030	0.984	1.011	1.092	0.964	0.983	0.986	0.979	1.019	1.070	1.029	1.154	0.964	1.017
98.0	0.938	0.963	1.021	0.984	1.049	0.981	0.934	0.979	0.940	0.982	0.965	1.093	1.030	0.959	0.983	1.207	0.934	0.982
105.8	0.710		0.694		0.771		0.634		0.663		0.662		0.720		0.689		0.634	0.692
116.0	0.670		0.686		0.864		0.673		0.677		0.639		0.725		0.666		0.639	0.675
124.5	0.651		0.647		0.765		0.623		0.783		0.633		0.681		0.641		0.623	0.649
133.0	0.724		0.721		0.749		0.718		0.886		0.711		0.761		0.705		0.705	0.723
145.5	0.489		0.524		0.485		0.521		0.517		0.525		0.531		0.475		0.475	0.519
158.5	0.535		0.522		0.512		0.509		0.507		0.540		0.531		0.506		0.506	0.517
168.3	0.769		0.746		0.744		0.694		0.747		0.689		0.751		0.760		0.689	0.747
177.7	1.155		1.139		1.135		1.101		1.104		1.150		1.168		1.103		1.101	1.137
192.5	0.665		0.634		0.675		0.635		0.698		0.596		0.760		0.613		0.596	0.650
202.5	0.500		0.448		0.464		0.481		0.438		0.451		0.477		0.475		0.438	0.470
214.0	0.473		0.446		0.416		0.416		0.418		0.427		0.448		0.427		0.416	0.427
227.3	0.551		0.611		0.592		0.548		0.559		0.544		0.559		0.548		0.544	0.555
238.3	0.361		0.434		0.401		0.420		0.399		0.419		0.424		0.401		0.361	0.410
250.0	0.368		0.330		0.357		0.362		0.333		0.318		0.341		0.342		0.318	0.342
267.0	0.331		0.397		0.317		0.358		0.323		0.302		0.294		0.310		0.294	0.320
283.9	0.365		0.330		0.342		0.340		0.310		0.332		0.319		0.338		0.310	0.335
299.1	0.850		0.869		0.837		0.875		0.848		0.853		0.837		0.865		0.837	0.852
322.0	0.319		0.300		0.297		0.292		0.271		0.279		0.290		0.312		0.271	0.294
339.0	0.323		0.321		0.314		0.316		0.309		0.298		0.294		0.275		0.275	0.312
344.0	0.359		0.348		0.386		0.370		0.360		0.341		0.383		0.389		0.341	0.365
358.0	0.409		0.357		0.347		0.382		0.349		0.382		0.374		0.350		0.347	0.366
363.0	0.398		0.412		0.382		0.375		0.381		0.401		0.389		0.358		0.358	0.386
367.0	0.425		0.395		0.430		0.427		0.399		0.410		0.382		0.418		0.382	0.414
372.0	0.425		0.401		0.375		0.411		0.368		0.368		0.377		0.347		0.347	0.376
375.0	0.524		0.473		0.470		0.477		0.481		0.471		0.485		0.446		0.446	0.475
377.5	0.669		0.688		0.647		0.662		0.572		0.671		0.607		0.547		0.547	0.655

A

TABLE 23
RSRM-7B AFT CENTER SEGMENT INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	2.59	2.80	2.88	2.58	2.88	2.92	2.79	3.48	2.58	136.0	2.0
11.0	2.20	2.19	2.18	2.12	1.99	2.03	2.04	2.28	1.99	180.0	1.5
30.7	2.50	2.14	2.27	2.40	2.44	2.23	2.57	2.55	2.14	46.0	1.5
36.2	3.12	2.48	2.53	2.58	3.16	2.45	2.71	2.75	2.45	226.0	1.5
39.7	2.65	2.38	2.43	2.47	2.89	2.15	2.69	2.67	2.15	226.0	1.5
44.6	7.20	3.67	4.14	3.75	5.54	4.00	4.29	3.83	3.67	46.0	1.5
48.0	3.13	3.47	3.51	3.03	3.51	3.00	3.69	3.56	3.00	226.0	1.5
71.5	2.93	4.86	4.36	3.70	5.15	2.36	3.86	2.83	2.36	226.0	1.5
126.0	4.55	6.00	4.05	4.69	4.84	2.78	3.06	3.75	2.78	226.0	1.5
153.5	7.37	10.77	5.83	8.24	5.00	3.04	3.33	3.33	3.04	226.0	1.5
161.4	3.47	3.75	3.42	4.72	3.23	4.72	3.75	4.82	3.23	180.0	2.0
214.1	+	8.12	10.83	+	+	+	8.67	+	8.12	46.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 1.99 AT THE 11.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	3.61	3.83	3.94	3.58	3.93	3.97	3.70	4.62	3.58	136.0	2.0
11.0	3.05	3.06	3.04	2.87	2.81	2.89	2.94	3.15	2.81	180.0	1.5
30.7	2.84	2.44	2.57	2.77	2.74	2.56	2.91	2.90	2.44	46.0	1.5
36.2	4.53	3.51	3.58	3.65	4.44	3.47	3.88	3.83	3.47	226.0	1.5
39.7	4.22	3.81	3.76	3.74	4.44	3.44	4.25	3.96	3.44	226.0	1.5
44.6	7.60	4.21	4.54	4.21	6.20	4.44	4.90	4.21	4.21	136.0	1.5
48.0	4.53	5.01	4.83	4.27	4.98	4.21	5.28	4.91	4.21	226.0	1.5
71.5	3.22	5.51	4.95	4.22	5.97	2.81	4.36	3.20	2.81	226.0	1.5
126.0	4.88	6.68	4.57	5.28	5.45	3.19	3.37	4.10	3.19	226.0	1.5
153.5	8.47	12.38	6.67	9.65	5.96	3.70	3.83	3.81	3.70	226.0	1.5
161.4	9.41	10.17	9.22	12.54	8.60	12.84	10.22	12.49	8.60	180.0	2.0
214.1	+	8.31	11.25	+	+	+	8.87	+	8.31	46.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 2.44 AT THE 30.7 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 23
RSRM-7B AFT CENTER SEGMENT INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.819	0.757	0.736	0.823	0.736	0.727	0.760	0.609	0.747	0.823	1.067
11.0	0.863<	0.869<	0.873<	0.897<	0.956<	0.936<	0.933<	0.835<	0.885	0.956	0.829
30.7	0.300	0.351	0.331	0.312	0.307	0.336	0.292	0.294	0.310	0.351	0.484
36.2	0.192	0.242	0.237	0.233	0.190	0.245	0.221	0.218	0.227	0.245	0.318
39.7	0.162	0.181	0.177	0.174	0.149	0.200	0.160	0.161	0.168	0.200	0.205
44.6	0.050	0.098<	0.087	0.096<	0.065	0.090	0.084	0.094<	0.089	0.098	0.090
48.0	0.092<	0.083	0.082	0.095<	0.082	0.096<	0.078	0.081	0.082	0.096	0.089
71.5	0.058	0.035	0.039	0.046	0.033	0.072	0.044	0.060	0.045	0.072	0.086
126.0	0.033	0.025	0.037	0.032	0.031	0.054	0.049	0.040	0.035	0.054	0.074
153.5	0.019	0.013	0.024	0.017	0.028	0.046	0.042	0.042	0.026	0.046	0.059
161.4	0.068	0.063	0.069	0.050	0.073	0.050	0.063	0.049	0.063	0.073	0.082
214.1	0	0.016	0.012	0	0	0	0.015	0	0	0.016	0.029
280.0	0	0	0	0	0	0	0	0	0	0	0.005
298.0	0	0	0	0	0	0	0	0	0	0	0.005
307.8	0	0	0	0	0	0	0	0	0	0	0.003
311.8	0	0	0	0	0	0	0	0	0	0	0.003
314.0	0	0	0	0	0	0	0	0	0	0	0.003

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	AVE.	EXPOSURE TIME
3.5	7.3	6.7	6.5	7.3	6.5	6.5	6.8	5.4	6.6	112.5
11.0	8.8	8.9	8.9	9.2	9.8	9.6	9.6	8.6	9.2	97.6
30.7	6.3	7.4	7.0	6.6	6.4	7.1	6.1	6.2	6.6	47.6
36.2	5.9	7.4	7.3	7.1	5.8	7.5	6.8	6.7	6.8	32.6
39.7	7.3	8.2	8.0	7.8	6.7	9.0	7.2	7.3	7.7	22.2
44.6	4.2	8.2	7.3	8.0	5.4	7.5	7.0	7.8	6.9	12.0
48.0	8.1	7.3	7.3	8.4	7.3	8.5	6.9	7.2	7.6	11.3
71.5	5.7	3.4	3.8	4.5	3.2	7.1	4.3	5.9	4.7	10.2
126.0	3.7	2.8	4.2	3.6	3.5	6.1	5.6	4.5	4.3	8.8
153.5	2.4	1.7	3.1	2.2	3.6	5.9	5.4	5.4	3.7	7.8
161.4	6.8	6.3	6.9	5.0	7.3	5.0	6.3	4.9	6.1	10.0
214.1	0	2.7	2.0	0	0	0	2.5	0	0.9	6.0
280.0	0	0	0	0	0	0	0	0	0	3.4
298.0	0	0	0	0	0	0	0	0	0	2.8
307.8	0	0	0	0	0	0	0	0	0	2.0
311.8	0	0	0	0	0	0	0	0	0	2.0
314.0	0	0	0	0	0	0	0	0	0	0.6

MOTOR ACTION TIME = 0.0 SECONDS

TABLE 23
RSRM-7B AFT CENTER SEGMENT INSULATION PERFORMANCE

PART NO. 1U76667-01 PREFIRE MEASUREMENTS
SERIAL NO. 0000006 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN	MDT
3.5	2.960	2.903	2.903	2.944	2.893	2.885	2.812	2.811	2.811	2.898	2.120
11.0	2.632	2.656	2.656	2.578	2.684	2.707	2.745	2.632	2.578	2.656	1.900
30.7	0.851	0.858	0.851	0.864	0.842	0.860	0.850	0.852	0.842	0.852	0.750
36.2	0.870	0.850	0.849	0.850	0.843	0.850	0.857	0.834	0.834	0.850	0.600
39.7	0.684	0.690	0.666	0.650	0.662	0.687	0.680	0.637	0.637	0.673	0.430
44.6	0.380	0.413	0.395	0.404	0.403	0.400	0.412	0.396	0.380	0.402	0.360
48.0	0.417	0.416	0.396	0.406	0.408	0.404	0.412	0.398	0.396	0.407	0.288
71.5	0.187	0.193	0.193	0.194	0.197	0.202	0.192	0.192	0.187	0.193	0.170
126.0	0.161	0.167	0.169	0.169	0.169	0.172	0.165	0.164	0.161	0.168	0.150
153.5	0.161	0.161	0.160	0.164	0.167	0.170	0.161	0.160	0.160	0.161	0.140
161.4	0.640	0.641	0.636	0.627	0.628	0.642	0.644	0.612	0.612	0.638	0.236
214.1	0.130	0.133	0.135	0.135	0.139	0.142	0.133	0.133	0.130	0.134	0.130
280.0	0.097	0.099	0.098	0.100	0.109	0.103	0.096	0.092	0.092	0.098	0.090
298.0	0.094	0.100	0.099	0.100	0.096	0.102	0.093	0.092	0.092	0.098	0.090
307.8	0.108	0.099	0.115	0.100	0.100	0.110	0.116	0.093	0.093	0.104	0.090
311.8	0.095	0.097	0.109	0.100	0.102	0.116	0.110	0.093	0.093	0.101	0.090
314.0	0.091	0.097	0.107	0.105	0.100	0.115	0.114	0.091	0.091	0.102	0.090

PART NO. 1U76652-02 POSTFIRE MEASUREMENTS
SERIAL NO. 000003 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN
3.5	2.141	2.146	2.167	2.121	2.157	2.158	2.052	2.202	2.052	2.151
11.0	1.769	1.787	1.783	1.681	1.728	1.771	1.812	1.797	1.681	1.777
30.7	0.551	0.507	0.520	0.552	0.535	0.524	0.558	0.558	0.507	0.543
36.2	0.678	0.608	0.612	0.617	0.653	0.605	0.636	0.616	0.605	0.617
39.7	0.522	0.509	0.489	0.476	0.513	0.487	0.520	0.476	0.476	0.499
44.6	0.330	0.315	0.308	0.308	0.338	0.310	0.328	0.302	0.302	0.313
48.0	0.325	0.333	0.314	0.311	0.326	0.308	0.334	0.317	0.308	0.321
71.5	0.129	0.158	0.154	0.148	0.164	0.130	0.148	0.132	0.129	0.148
126.0	0.128	0.142	0.132	0.137	0.138	0.118	0.116	0.124	0.116	0.130
153.5	0.142	0.148	0.136	0.147	0.139	0.124	0.119	0.118	0.118	0.138
161.4	0.572	0.578	0.567	0.577	0.555	0.592	0.581	0.563	0.555	0.575
214.1	L	0.117	0.123	L	L	L	0.118	L	0.117	0.132
280.0	L	L	L	L	L	L	L	L	L	0.098
298.0	L	L	L	L	L	L	L	L	L	0.098
307.8	L	L	L	L	L	L	L	L	L	0.104
311.8	L	L	L	L	L	L	L	L	L	0.101
314.0	L	L	L	L	L	L	L	L	L	0.102

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 24
RSRM-7B FORWARD CENTER SEGMENT INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	20.99	14.52	84.80	19.45	13.86	14.32	15.25	25.24	13.86	180.0	2.0
11.0	19.39	9.55	13.67	24.05	13.29	51.35	+	16.96	9.55	46.0	1.5
30.7	7.58	8.06	11.90	4.81	8.72	9.38	14.71	8.62	4.81	136.0	1.5
36.2	9.37	6.98	9.84	8.11	8.22	11.32	8.82	9.37	6.98	46.0	1.5
39.7	6.42	5.24	14.83	5.97	8.96	5.81	7.54	9.77	5.24	46.0	1.5
44.6	18.00	32.73	21.18	16.36	13.33	45.00	27.69	9.47	9.47	316.0	1.5
48.0	7.78	10.29	28.80	7.78	9.29	22.15	12.52	13.09	7.78	0.0	1.5
71.5	6.07	8.95	7.08	3.70	8.95	14.17	5.67	34.00	3.70	136.0	1.5
126.0	3.85	6.82	7.89	12.50	+	+	6.25	7.50	3.85	0.0	1.5
153.5	+	6.67	10.00	7.37	+	+	+	+	6.67	46.0	1.5
161.4	3.32	6.94	+	8.74	3.52	10.26	4.54	6.74	3.32	0.0	2.0
214.1	43.33	9.29	+	+	+	+	+	+	9.29	46.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 3.32 AT THE 161.4 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	PLANE	REQUIRED S.F.
3.5	24.95	17.05	+	22.80	16.46	16.47	18.19	29.49	16.46	180.0	2.0
11.0	23.07	11.94	17.88	31.11	16.71	64.70	+	20.24	11.94	46.0	1.5
30.7	7.86	8.73	12.67	5.35	9.21	9.86	15.37	9.02	5.35	136.0	1.5
36.2	12.16	9.60	13.10	10.81	11.11	15.15	11.68	12.48	9.60	46.0	1.5
39.7	9.25	7.90	21.83	8.99	12.73	8.54	10.96	14.16	7.90	46.0	1.5
44.6	18.30	33.91	22.35	17.27	13.78	45.62	28.46	9.76	9.76	316.0	1.5
48.0	9.89	13.39	37.90	10.32	12.06	28.31	16.00	16.95	9.89	0.0	1.5
71.5	6.86	10.21	7.96	4.33	10.11	16.00	6.40	38.20	4.33	136.0	1.5
126.0	4.15	7.32	8.42	13.42	+	+	6.58	7.95	4.15	0.0	1.5
153.5	+	7.57	11.14	8.53	+	+	+	+	7.57	46.0	1.5
161.4	8.85	17.74	+	23.85	9.73	27.39	12.46	19.09	8.85	0.0	2.0
214.1	46.33	9.86	+	+	+	+	+	+	9.86	46.0	1.5
280.0	+	+	+	+	+	+	+	+	+	0.0	1.5
298.0	+	+	+	+	+	+	+	+	+	0.0	1.5
307.8	+	+	+	+	+	+	+	+	+	0.0	1.5
311.8	+	+	+	+	+	+	+	+	+	0.0	1.5
314.0	+	+	+	+	+	+	+	+	+	0.0	1.5

SEGMENT MINIMUM = 4.15 AT THE 126.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

TABLE 24
RSRM-7B FORWARD CENTER SEGMENT INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION	DEGREE LOCATIONS										DESIGN
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MEDIAN	MAX.	M+3S
3.5	0.101	0.146	0.025	0.109	0.153	0.148	0.139	0.084	0.124	0.153	1.067
11.0	0.098	0.199	0.139	0.079	0.143	0.037	0	0.112	0.105	0.199	0.829
30.7	0.099	0.093	0.063	0.156	0.086	0.080	0.051	0.087	0.087	0.156	0.484
36.2	0.064	0.086	0.061	0.074	0.073	0.053	0.068	0.064	0.066	0.086	0.318
39.7	0.067	0.082	0.029	0.072	0.048	0.074	0.057	0.044	0.062	0.082	0.205
44.6	0.020	0.011	0.017	0.022	0.027	0.008	0.013	0.038	0.019	0.038	0.090
48.0	0.037	0.028	0.010	0.037	0.031	0.013	0.023	0.022	0.025	0.037	0.089
71.5	0.028	0.019	0.024	0.046	0.019	0.012	0.030	0.005	0.022	0.046	0.086
126.0	0.039	0.022	0.019	0.012	0	0	0.024	0.020	0.019	0.039	0.074
153.5	0	0.021	0.014	0.019	0	0	0	0	0	0.021	0.059
161.4	0.071	0.034	0	0.027	0.067	0.023	0.052	0.035	0.034	0.071	0.082
214.1	0.003	0.014	0	0	0	0	0	0	0	0.014	0.029
280.0	0	0	0	0	0	0	0	0	0	0	0.005
298.0	0	0	0	0	0	0	0	0	0	0	0.005
307.8	0	0	0	0	0	0	0	0	0	0	0.003
311.8	0	0	0	0	0	0	0	0	0	0	0.003
314.0	0	0	0	0	0	0	0	0	0	0	0.003

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION	DEGREE LOCATIONS									EXPOSURE
(IN)	0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	AVE.	TIME
3.5	0.9	1.3	0.2	1.0	1.4	1.3	1.2	0.7	1.0	112.7
11.0	1.0	2.0	1.4	0.8	1.5	0.4	0	1.1	1.0	98.0
30.7	2.1	1.9	1.3	3.2	1.8	1.7	1.1	1.8	1.9	48.0
36.2	1.9	2.6	1.8	2.2	2.2	1.6	2.0	1.9	2.0	33.2
39.7	2.9	3.6	1.3	3.2	2.1	3.2	2.5	1.9	2.6	22.8
44.6	1.6	0.9	1.3	1.7	2.1	0.6	1.0	3.0	1.5	12.8
48.0	3.1	2.3	0.8	3.1	2.6	1.1	1.9	1.8	2.1	12.1
71.5	2.5	1.7	2.2	4.2	1.7	1.1	2.7	0.5	2.1	11.0
126.0	4.1	2.3	2.0	1.2	0	0	2.5	2.1	1.8	9.6
153.5	0	2.4	1.6	2.2	0	0	0	0	0.8	8.8
161.4	6.6	3.1	0	2.5	6.2	2.1	4.8	3.2	3.6	10.8
214.1	0.4	1.9	0	0	0	0	0	0	0.3	7.2
280.0	0	0	0	0	0	0	0	0	0	4.2
298.0	0	0	0	0	0	0	0	0	0	4.0
307.8	0	0	0	0	0	0	0	0	0	3.4
311.8	0	0	0	0	0	0	0	0	0	3.4
314.0	0	0	0	0	0	0	0	0	0	0.6

MOTOR ACTION TIME = 122.9 SECONDS

TABLE 24
RSRM-7B FORWARD CENTER SEGMENT INSULATION PERFORMANCE

PART NO. 1U76667-01 PREFIRE MEASUREMENTS
SERIAL NO. 0000008 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN	MDT
3.5	2.520	2.489	2.503	2.485	2.519	2.438	2.528	2.477	2.438	2.496	2.120
11.0	2.261	2.376	2.485	2.458	2.389	2.394	2.322	2.267	2.261	2.382	1.900
30.7	0.778	0.812	0.798	0.835	0.792	0.789	0.784	0.785	0.778	0.790	0.750
36.2	0.778	0.826	0.799	0.800	0.811	0.803	0.794	0.799	0.778	0.800	0.600
39.7	0.620	0.648	0.633	0.647	0.611	0.632	0.625	0.623	0.611	0.629	0.430
44.6	0.366	0.373	0.380	0.380	0.372	0.365	0.370	0.371	0.365	0.372	0.360
48.0	0.366	0.375	0.379	0.382	0.374	0.368	0.368	0.373	0.366	0.374	0.288
71.5	0.192	0.194	0.191	0.199	0.192	0.192	0.192	0.191	0.191	0.192	0.170
126.0	0.162	0.161	0.160	0.161	0.158	0.160	0.158	0.159	0.158	0.160	0.150
153.5	0.153	0.159	0.156	0.162	0.156	0.157	0.157	0.160	0.153	0.157	0.140
161.4	0.628	0.603	0.602	0.644	0.652	0.630	0.648	0.668	0.602	0.637	0.236
214.1	0.139	0.138	0.142	0.142	0.135	0.142	0.140	0.140	0.135	0.140	0.130
280.0	0.111	0.111	0.113	0.112	0.109	0.110	0.112	0.107	0.107	0.111	0.090
298.0	0.109	0.112	0.110	0.110	0.109	0.110	0.109	0.109	0.109	0.109	0.090
307.8	0.106	0.114	0.114	0.110	0.106	0.107	0.107	0.106	0.106	0.107	0.090
311.8	0.108	0.114	0.109	0.112	0.106	0.109	0.107	0.107	0.106	0.109	0.090
314.0	0.109	0.115	0.109	0.113	0.107	0.109	0.109	0.109	0.107	0.109	0.090

PART NO. 1U76651-04 POSTFIRE MEASUREMENTS
SERIAL NO. 0000003 INCHES

STATION (IN)	DEGREE LOCATIONS 0.0	46.0	90.0	136.0	180.0	226.0	270.0	316.0	MIN.	MEDIAN
3.5	2.419	2.343	2.478	2.376	2.366	2.290	2.389	2.393	2.290	2.382
11.0	2.163	2.177	2.346	2.379	2.246	2.357	2.464	2.155	2.155	2.296
30.7	0.679	0.719	0.735	0.679	0.706	0.709	0.733	0.698	0.679	0.707
36.2	0.714	0.740	0.738	0.726	0.738	0.750	0.726	0.735	0.714	0.737
39.7	0.553	0.566	0.604	0.575	0.563	0.558	0.568	0.579	0.553	0.567
44.6	0.346	0.362	0.363	0.358	0.345	0.357	0.357	0.333	0.333	0.357
48.0	0.329	0.347	0.369	0.345	0.343	0.355	0.345	0.351	0.329	0.346
71.5	0.164	0.175	0.167	0.153	0.173	0.180	0.162	0.186	0.153	0.170
126.0	0.123	0.139	0.141	0.149	L	L	0.134	0.139	0.123	0.140
153.5	L	0.138	0.142	0.143	L	L	L	L	0.138	0.155
161.4	0.557	0.569	0.673	0.617	0.585	0.607	0.596	0.633	0.557	0.602
214.1	0.136	0.124	L	L	L	L	L	L	0.124	0.140
280.0	L	L	L	L	L	L	L	L	L	0.111
298.0	L	L	L	L	L	L	L	L	L	0.109
307.8	L	L	L	L	L	L	L	L	L	0.107
311.8	L	L	L	L	L	L	L	L	L	0.109
314.0	L	L	L	L	L	L	L	L	L	0.109

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 25
RSRM-7B FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	PLANE	REQUIRED S.F.
3.5	+	33.65	+	22.55	+	22.55	286.0	2.0
13.0	5.24	3.04	3.55	3.78	6.44	3.04	154.0	1.5
27.0	+	+	+	+	+	+	90.0	1.5
30.7	+	+	+	+	+	+	90.0	1.5
34.2	+	+	+	+	+	+	90.0	1.5
37.7	+	+	+	+	+	+	90.0	1.5
41.2	+	+	+	+	+	+	90.0	1.5
44.0	+	+	+	+	+	+	90.0	1.5
94.7	+	+	+	+	+	+	90.0	1.5
142.0	+	+	+	+	+	+	90.0	1.5
145.7	+	+	+	13.76	+	13.76	286.0	1.5
148.5	6.57	6.57	13.80	3.49	5.02	3.49	286.0	1.5
152.0	7.20	5.56	9.06	10.23	5.20	5.20	352.0	1.5
162.0	3.65	3.42	3.48	2.42	2.88	2.42	286.0	2.0
175.5	3.08	3.00	3.41	3.43	2.90	2.90	352.0	1.5
187.0	2.83	2.70	2.91	2.64	2.21	2.21	352.0	1.5
199.0	2.36	2.75	2.80	2.35	2.65	2.35	286.0	1.5
215.0	3.09	3.28	3.28	2.64	2.94	2.64	286.0	1.5
224.0	2.38	2.79	2.83	2.61	2.12	2.12	352.0	1.5
230.0	2.63	2.64	2.83	2.42	2.83	2.42	286.0	1.5
236.0	2.24	2.16	2.81	2.44	3.03	2.16	154.0	1.5
240.0	2.42	2.63	2.60	2.35	3.66	2.35	286.0	1.5
254.0	2.51	2.22	2.40	2.10	2.63	2.10	286.0	1.5
263.0	2.70	2.81	2.64	2.41	3.14	2.41	286.0	1.5
282.0	2.56	2.65	2.93	2.22	2.78	2.22	286.0	1.5
293.0	2.90	2.36	2.59	2.46	3.55	2.36	154.0	1.5
305.0	1.94	2.01	2.85	2.49	2.57	1.94	90.0	1.5
312.0	3.28	2.79	3.06	2.77	4.10	2.77	286.0	1.5
321.0	4.06	4.64	5.92	6.42	7.98	4.06	90.0	2.0
339.0	3.60	2.34	2.92	2.35	2.92	2.34	154.0	1.5
350.0	5.88	3.08	3.46	2.81	3.02	2.81	286.0	1.5
362.0	4.00	2.50	3.80	2.59	1.90	1.90	352.0	1.5
371.0	2.69	2.77	5.00	3.06	2.10	2.10	352.0	1.5
383.0	2.16	3.08	2.47	2.76	3.17	2.16	90.0	1.5
394.0	1.95	1.88	1.76	1.89	3.31	1.76	222.0	1.5
403.0	4.97	4.61	4.85	4.61	4.85	4.61	154.0	1.5

SEGMENT MINIMUM = 1.76 AT THE 394.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	PLANE
3.5	+	40.19	+	26.54	+	26.54	286.0
13.0	7.29	4.48	5.44	5.37	8.45	4.48	154.0
27.0	+	+	+	+	+	+	90.0
30.7	+	+	+	+	+	+	90.0
34.2	+	+	+	+	+	+	90.0
37.7	+	+	+	+	+	+	90.0
41.2	+	+	+	+	+	+	90.0
44.0	+	+	+	+	+	+	90.0
94.7	+	+	+	+	+	+	90.0
142.0	+	+	+	+	+	+	90.0
145.7	+	+	+	15.29	+	15.29	286.0
148.5	7.98	7.52	16.15	4.09	5.78	4.09	286.0
152.0	8.73	6.72	10.89	12.26	6.43	6.43	352.0
162.0	5.59	4.98	5.14	3.80	4.41	3.80	286.0
175.5	3.90	3.63	4.02	4.25	3.51	3.51	352.0
187.0	3.04	2.85	3.05	2.81	2.34	2.34	352.0
199.0	2.63	3.05	3.06	2.72	2.93	2.63	90.0
215.0	3.21	3.38	3.48	2.78	3.10	2.78	286.0
224.0	2.66	3.09	3.19	2.90	2.36	2.36	352.0
230.0	2.72	2.76	2.89	2.53	2.89	2.53	286.0
236.0	2.47	2.34	3.04	2.74	3.28	2.34	154.0
240.0	2.65	2.89	2.86	2.57	4.01	2.57	286.0
254.0	2.82	2.39	2.69	2.49	2.96	2.39	154.0
263.0	2.88	3.04	2.80	2.54	3.25	2.54	286.0
282.0	2.78	2.80	3.14	2.43	3.00	2.43	286.0
293.0	3.15	2.56	2.84	2.64	3.72	2.56	154.0
305.0	2.33	2.36	3.11	2.86	2.81	2.33	90.0
312.0	3.98	3.38	3.76	3.32	4.94	3.32	286.0
321.0	4.55	4.99	6.53	6.83	8.57	4.55	90.0
339.0	3.86	2.66	3.12	2.69	3.07	2.66	154.0
350.0	5.96	3.16	3.58	2.88	3.17	2.88	286.0
362.0	4.14	2.63	3.91	2.82	2.47	2.47	352.0
371.0	3.04	3.09	5.26	3.35	2.64	2.64	352.0
383.0	2.54	3.25	2.87	3.05	3.29	2.54	90.0
394.0	2.33	2.31	2.31	2.40	3.76	2.31	222.0
403.0	5.59	5.22	5.51	5.27	5.33	5.22	154.0

SEGMENT MINIMUM = 2.31 AT THE 394.0 INCH STATION

A

TABLE 25
RSRM-7B FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.012	0.063	0.012	0.094	0.016	0.016	0.094	0.103
13.0	0.124<	0.214<	0.183<	0.172<	0.101<	0.172	0.214	0.101
27.0	0	0	0	0	0	0	0	0.044
30.7	0	0	0	0	0	0	0	0.033
34.2	0	0	0	0	0	0	0	0.035
37.7	0	0	0	0	0	0	0	0.028
41.2	0	0	0	0	0	0	0	0.023
44.0	0	0	0	0	0	0	0	0.015
94.7	0	0	0	0	0	0	0	0.004
142.0	0	0	0	0	0	0	0	0.019
145.7	0	0	0	0.017	0.001	0	0.017	0.081
148.5	0.042	0.042	0.020	0.079	0.055	0.042	0.079	0.135
152.0	0.044	0.057	0.035	0.031	0.061	0.044	0.061	0.123
162.0	0.150	0.160	0.157	0.226	0.190	0.160	0.226	0.227
175.5	0.196	0.201	0.177	0.176	0.208	0.196	0.208	0.324
187.0	0.226	0.237	0.220	0.242	0.290	0.237	0.290	0.398
199.0	0.273	0.234	0.230	0.274	0.243	0.243	0.274	0.427
215.0	0.207	0.195	0.195	0.242	0.217	0.207	0.242	0.423
224.0	0.269	0.229	0.226	0.245	0.302	0.245	0.302	0.422
230.0	0.243	0.242	0.226	0.264	0.226	0.242	0.264	0.375
236.0	0.258	0.268	0.206	0.237	0.191	0.237	0.268	0.327
240.0	0.237	0.218	0.221	0.244	0.157	0.221	0.244	0.342
254.0	0.226	0.256	0.237	0.270	0.216	0.237	0.270	0.318
263.0	0.210	0.202	0.215	0.236	0.181	0.210	0.236	0.334
282.0	0.222	0.214	0.194	0.256	0.204	0.214	0.256	0.349
293.0	0.188	0.231	0.211	0.222	0.154	0.211	0.231	0.330
305.0	0.271	0.261	0.184	0.211	0.204	0.211	0.271	0.309
312.0	0.165	0.194	0.177	0.195	0.132	0.177	0.195	0.308
321.0	0.226	0.198	0.155	0.143	0.115	0.155	0.226	0.434
339.0	0.153	0.235	0.189	0.234	0.189	0.189	0.235	0.319
350.0	0.089	0.170	0.151	0.186	0.173	0.170	0.186	0.300
362.0	0.130	0.208	0.137	0.201	0.274	0.201	0.274	0.285
371.0	0.193	0.188	0.104	0.170	0.248	0.188	0.248	0.304
383.0	0.237	0.166	0.207	0.185	0.161	0.185	0.237	0.295
394.0	0.258	0.268	0.286	0.266	0.152	0.266	0.286	0.287
403.0	0.191	0.206	0.196	0.206	0.196	0.196	0.206	0.287

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	AVE.	EXPOSURE TIME
3.5	0.3	1.8	0.3	2.7	0.5	1.1	34.3
13.0	6.4	11.0	9.4	8.9	5.2	8.2	19.4
27.0	0	0	0	0	0	0	4.8
30.7	0	0	0	0	0	0	4.8
34.2	0	0	0	0	0	0	4.2
37.7	0	0	0	0	0	0	3.6
41.2	0	0	0	0	0	0	3.6
44.0	0	0	0	0	0	0	3.0
94.7	0	0	0	0	0	0	0.8
142.0	0	0	0	0	0	0	1.0
145.7	0	0	0	1.2	0.1	0.3	13.8
148.5	1.9	1.9	0.9	3.5	2.5	2.1	22.3
152.0	1.4	1.8	1.1	1.0	1.9	1.4	32.5
162.0	2.6	2.8	2.7	3.9	3.3	3.1	57.9
175.5	2.2	2.3	2.0	2.0	2.3	2.2	89.0
187.0	2.2	2.3	2.2	2.4	2.8	2.4	101.8
199.0	2.7	2.3	2.3	2.7	2.4	2.5	101.8
215.0	2.0	1.9	1.9	2.4	2.1	2.1	101.8
224.0	2.6	2.2	2.2	2.4	3.0	2.5	101.8
230.0	2.4	2.4	2.2	2.6	2.2	2.4	101.8
236.0	2.5	2.6	2.0	2.3	1.9	2.3	101.8
240.0	2.3	2.1	2.2	2.4	1.5	2.1	101.8
254.0	2.2	2.5	2.3	2.7	2.1	2.4	101.8
263.0	2.1	2.0	2.1	2.3	1.8	2.1	101.8
282.0	2.2	2.1	1.9	2.5	2.0	2.1	101.8
293.0	1.8	2.3	2.1	2.2	1.5	2.0	101.8
305.0	2.7	2.6	1.8	2.1	2.0	2.2	101.8
312.0	1.6	1.9	1.7	1.9	1.3	1.7	101.8
321.0	2.2	1.9	1.5	1.4	1.1	1.6	103.9
339.0	1.5	2.3	1.9	2.3	1.9	2.0	100.4
350.0	0.9	1.7	1.5	1.9	1.7	1.5	100.2
362.0	1.3	2.1	1.4	2.0	2.8	1.9	99.2
371.0	2.0	2.0	1.1	1.8	2.6	1.9	94.8
383.0	2.5	1.7	2.2	1.9	1.7	2.0	96.0
394.0	2.6	2.7	2.9	2.7	1.6	2.5	97.6
403.0	1.6	1.7	1.6	1.7	1.6	1.6	122.9

MOTOR ACTION TIME = 122.9 SECONDS

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

TABLE 25
RSRM-7B FORWARD SEGMENT STAR TIP INSULATION PERFORMANCE

PREFIRE MEASUREMENTS INCHES — PART NO. 1U76666-01 SERIAL NO. 0000005

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	MEDIAN	MDT
3.5	2.554	2.532	2.444	2.495	2.451	2.444	2.495	2.120
13.0	0.904	0.958	0.995	0.923	0.853	0.853	0.923	0.650
27.0	0.594	0.622	0.585	0.626	0.629	0.585	0.622	0.450
30.7	0.461	0.445	0.428	0.455	0.446	0.428	0.446	0.400
34.2	0.482	0.487	0.474	0.491	0.496	0.474	0.487	0.380
37.7	0.400	0.392	0.375	0.398	0.368	0.368	0.392	0.330
41.2	0.293	0.294	0.292	0.283	0.290	0.283	0.292	0.280
44.0	0.286	0.295	0.289	0.281	0.295	0.281	0.289	0.250
94.7	0.110	0.109	0.111	0.107	0.107	0.107	0.109	0.090
142.0	0.156	0.156	0.164	0.157	0.159	0.156	0.157	0.113
145.7	0.336	0.258	0.266	0.260	0.260	0.258	0.260	0.234
148.5	0.335	0.316	0.323	0.323	0.318	0.316	0.323	0.276
152.0	0.384	0.383	0.381	0.380	0.392	0.380	0.383	0.317
162.0	0.839	0.797	0.8^7	0.858	0.838	0.797	0.838	0.547
175.5	0.765	0.729	0.712	0.748	0.730	0.712	0.730	0.604
187.0	0.686	0.676	0.671	0.680	0.678	0.671	0.678	0.640
199.0	0.717	0.713	0.704	0.744	0.712	0.704	0.713	0.643
215.0	0.665	0.660	0.678	0.672	0.673	0.660	0.672	0.639
224.0	0.715	0.707	0.721	0.710	0.712	0.707	0.712	0.639
230.0	0.662	0.669	0.653	0.669	0.653	0.653	0.662	0.639
236.0	0.638	0.626	0.627	0.650	0.626	0.626	0.627	0.578
240.0	0.627	0.631	0.633	0.626	0.630	0.626	0.630	0.574
254.0	0.637	0.613	0.637	0.673	0.639	0.613	0.637	0.568
263.0	0.605	0.614	0.603	0.599	0.588	0.588	0.603	0.568
282.0	0.617	0.599	0.609	0.622	0.612	0.599	0.612	0.568
293.0	0.592	0.591	0.600	0.586	0.573	0.573	0.591	0.546
305.0	0.631	0.616	0.572	0.603	0.573	0.572	0.603	0.525
312.0	0.657	0.656	0.665	0.648	0.652	0.648	0.656	0.541
321.0	1.029	0.988	1.012	0.977	0.985	0.977	0.988	0.918
339.0	0.591	0.625	0.590	0.630	0.580	0.580	0.591	0.551
350.0	0.530	0.538	0.540	0.536	0.548	0.530	0.538	0.523
362.0	0.538	0.547	0.536	0.566	0.676	0.536	0.547	0.520
371.0	0.586	0.580	0.547	0.570	0.655	0.547	0.580	0.520
383.0	0.601	0.540	0.595	0.564	0.529	0.529	0.564	0.511
394.0	0.601	0.619	0.660	0.638	0.571	0.571	0.619	0.503
403.0	1.068	1.075	1.079	1.085	1.045	1.045	1.075	0.950

POSTFIRE MEASUREMENTS INCHES — PART NO. 1U76650-04 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 90.0	154.0	222.0	286.0	352.0	MIN.	MEDIAN
3.5	2.542	2.469	2.432	2.401	2.435	2.401	2.435
13.0	0.780	0.744	0.812	0.751	0.752	0.744	0.752
27.0	L	L	L	L	L	L	0.622
30.7	L	L	L	L	L	L	0.446
34.2	L	L	L	L	L	L	0.487
37.7	L	L	L	L	L	L	0.392
41.2	L	L	L	L	L	L	0.292
44.0	L	L	L	L	L	L	0.289
94.7	L	L	L	L	L	L	0.109
142.0	L	L	L	L	L	L	0.157
145.7	L	L	L	0.243	0.259	0.243	0.259
148.5	0.293	0.274	0.303	0.244	0.263	0.244	0.274
152.0	0.340	0.326	0.346	0.349	0.331	0.326	0.340
162.0	0.689	0.637	0.650	0.632	0.648	0.632	0.648
175.5	0.569	0.528	0.535	0.572	0.522	0.522	0.535
187.0	0.460	0.439	0.451	0.438	0.388	0.388	0.439
199.0	0.444	0.479	0.474	0.470	0.469	0.444	0.470
215.0	0.458	0.465	0.483	0.430	0.456	0.430	0.458
224.0	0.446	0.478	0.495	0.465	0.410	0.410	0.465
230.0	0.419	0.427	0.427	0.405	0.427	0.405	0.427
236.0	0.380	0.358	0.421	0.413	0.435	0.358	0.413
240.0	0.390	0.413	0.412	0.382	0.473	0.382	0.412
254.0	0.411	0.357	0.400	0.403	0.423	0.357	0.403
263.0	0.395	0.412	0.388	0.363	0.407	0.363	0.395
282.0	0.395	0.385	0.415	0.366	0.408	0.366	0.395
293.0	0.404	0.360	0.389	0.364	0.419	0.360	0.389
305.0	0.360	0.355	0.388	0.392	0.369	0.355	0.369
312.0	0.492	0.462	0.488	0.453	0.520	0.453	0.488
321.0	0.803	0.790	0.857	0.834	0.870	0.790	0.834
339.0	0.438	0.390	0.401	0.396	0.391	0.390	0.396
350.0	0.441	0.368	0.389	0.350	0.375	0.350	0.375
362.0	0.408	0.339	0.399	0.365	0.402	0.339	0.399
371.0	0.393	0.392	0.443	0.400	0.407	0.392	0.400
383.0	0.364	0.374	0.388	0.379	0.368	0.364	0.374
394.0	0.343	0.351	0.374	0.372	0.419	0.343	0.372
403.0	0.877	0.869	0.883	0.879	0.849	0.849	0.877

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

TABLE 26
RSRM-7B FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

COMPLIANCE SAFETY FACTOR (CSF)

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	PLANE	REQUIRED S.F.
3.5	30.29	53.00	31.64	18.93	21.86	18.93	270.0	2.0
13.0	3.14	4.19	5.56	7.56	2.60	2.60	336.0	1.5
27.0	+	+	+	+	+	+	74.0	1.5
30.7	+	+	+	+	+	+	74.0	1.5
34.2	+	+	+	+	+	+	74.0	1.5
37.7	+	+	+	+	+	+	74.0	1.5
41.2	+	+	+	+	+	+	74.0	1.5
44.0	+	+	+	+	+	+	74.0	1.5
94.7	+	+	+	+	+	+	74.0	1.5
142.0	+	+	+	+	+	+	74.0	1.5
145.7	+	+	+	+	+	+	74.0	1.5
148.5	+	+	+	+	+	+	74.0	1.5
152.0	+	13.78	7.37	+	9.91	7.37	206.0	1.5
162.0	2.79	4.52	5.31	3.62	5.58	2.79	74.0	2.0
175.5	5.03	4.83	2.52	4.95	3.87	2.52	206.0	1.5
187.0	5.38	5.00	4.57	4.60	4.67	4.57	206.0	1.5
199.0	3.87	4.56	4.63	3.74	6.01	3.74	270.0	1.5
215.0	5.51	5.11	4.77	3.59	4.92	3.59	270.0	1.5
224.0	3.35	4.47	4.15	4.12	4.44	3.35	74.0	1.5
230.0	3.78	4.77	4.84	3.76	3.99	3.76	270.0	1.5
236.0	3.57	3.96	3.06	3.12	4.04	3.06	206.0	1.5
240.0	3.54	4.45	3.70	3.78	4.82	3.54	74.0	1.5
254.0	3.21	3.94	3.89	4.77	4.58	3.21	74.0	1.5
263.0	4.21	4.00	3.97	4.18	5.98	3.97	206.0	1.5
282.0	5.07	5.36	4.34	4.21	3.94	3.94	336.0	1.5
293.0	3.74	4.23	4.51	3.93	3.99	3.74	74.0	1.5
305.0	3.11	4.65	5.47	3.16	3.13	3.11	74.0	1.5
312.0	4.40	5.25	8.59	4.92	4.01	4.01	336.0	1.5
321.0	7.85	5.77	11.47	7.46	9.09	5.77	140.0	2.0
339.0	3.40	6.48	4.02	3.38	6.80	3.38	270.0	1.5
350.0	3.51	7.16	4.05	7.26	4.43	3.51	74.0	1.5
362.0	2.86	3.10	2.68	3.69	3.19	2.68	206.0	1.5
371.0	3.25	3.06	2.37	2.83	3.23	2.37	206.0	1.5
383.0	1.93	4.12	3.04	3.06	2.68	1.93	74.0	1.5
394.0	2.69	2.44	2.63	2.30	2.20	2.20	336.0	1.5
403.0	4.40	4.36	5.28	5.28	4.82	4.36	140.0	1.5

SEGMENT MINIMUM = 1.93 AT THE 383.0 INCH STATION
A " + " MEANS NEGLIGIBLE MDD HAS OCCURRED

ACTUAL SAFETY FACTOR (ASF)

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	PLANE
3.5	36.40	62.80	37.12	21.91	25.67	21.91	270.0
13.0	4.76	5.91	7.51	10.30	3.99	3.99	336.0
27.0	+	+	+	+	+	+	74.0
30.7	+	+	+	+	+	+	74.0
34.2	+	+	+	+	+	+	74.0
37.7	+	+	+	+	+	+	74.0
41.2	+	+	+	+	+	+	74.0
44.0	+	+	+	+	+	+	74.0
94.7	+	+	+	+	+	+	74.0
142.0	+	+	+	+	+	+	74.0
145.7	+	+	+	+	+	+	74.0
148.5	+	+	+	+	+	+	74.0
152.0	+	16.09	9.23	+	12.06	9.23	206.0
162.0	4.53	6.79	7.64	5.29	8.05	4.53	74.0
175.5	6.18	5.86	3.52	6.01	4.81	3.52	206.0
187.0	5.64	5.31	4.87	4.89	4.88	4.87	206.0
199.0	4.30	5.14	5.11	4.13	6.64	4.13	270.0
215.0	5.89	5.38	4.96	3.86	5.10	3.86	270.0
224.0	3.82	4.98	4.68	4.55	4.94	3.82	74.0
230.0	3.95	4.85	4.90	3.91	4.16	3.91	270.0
236.0	3.89	4.32	3.50	3.48	4.34	3.48	270.0
240.0	3.88	4.87	4.14	4.15	5.15	3.88	74.0
254.0	3.79	4.29	4.16	5.08	4.98	3.79	74.0
263.0	4.52	4.28	4.21	4.40	6.25	4.21	206.0
282.0	5.20	5.68	4.59	4.50	4.27	4.27	336.0
293.0	4.04	4.73	4.82	4.31	4.31	4.04	74.0
305.0	3.43	5.24	6.01	3.58	3.57	3.43	74.0
312.0	5.42	6.49	10.49	5.93	4.79	4.79	336.0
321.0	8.49	6.26	12.82	8.21	9.56	6.26	140.0
339.0	3.52	6.81	4.27	3.69	6.95	3.52	74.0
350.0	3.62	7.36	4.14	7.32	4.53	3.62	74.0
362.0	3.14	3.44	3.08	3.79	3.44	3.08	206.0
371.0	3.64	3.55	2.81	3.08	3.44	2.81	206.0
383.0	2.36	4.40	3.17	3.19	2.87	2.36	74.0
394.0	2.97	2.96	2.82	2.60	2.78	2.60	270.0
403.0	4.95	4.89	5.97	5.92	5.45	4.89	140.0

SEGMENT MINIMUM = 2.36 AT THE 383.0 INCH STATION

A

TABLE 26
RSRM-7B FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

MATERIAL DECOMPOSITION DEPTH (MDD)
INCHES

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MEDIAN	MAX.	DESIGN M+3S
3.5	0.070	0.040	0.067	0.112	0.097	0.070	0.112	0.103
13.0	0.207	0.155	0.117	0.086	0.250	0.155	0.250	0.101
27.0	0	0	0	0	0	0	0	0.044
30.7	0	0	0	0	0	0	0	0.033
34.2	0	0	0	0	0	0	0	0.035
37.7	0	0	0	0	0	0	0	0.028
41.2	0	0	0	0	0	0	0	0.023
44.0	0	0	0	0	0	0	0	0.015
94.7	0	0	0	0	0	0	0	0.004
142.0	0	0	0	0	0	0	0	0.019
145.7	0	0	0	0	0	0	0	0.081
148.5	0	0	0	0	0	0	0	0.135
152.0	0	0.023	0.043	0	0.032	0.023	0.043	0.123
162.0	0.196	0.121	0.103	0.151	0.098	0.121	0.196	0.227
175.5	0.120	0.125	0.240	0.122	0.156	0.125	0.240	0.324
187.0	0.119	0.128	0.140	0.139	0.137	0.137	0.140	0.398
199.0	0.166	0.141	0.139	0.172	0.107	0.141	0.172	0.427
215.0	0.116	0.125	0.134	0.178	0.130	0.130	0.178	0.423
224.0	0.191	0.143	0.154	0.155	0.144	0.154	0.191	0.422
230.0	0.169	0.134	0.132	0.170	0.160	0.160	0.170	0.375
236.0	0.162	0.146	0.189	0.185	0.143	0.162	0.189	0.327
240.0	0.162	0.129	0.155	0.152	0.119	0.152	0.162	0.342
254.0	0.177	0.144	0.146	0.119	0.124	0.144	0.177	0.318
263.0	0.135	0.142	0.143	0.136	0.095	0.136	0.143	0.334
282.0	0.112	0.106	0.131	0.135	0.144	0.131	0.144	0.349
293.0	0.146	0.129	0.121	0.139	0.137	0.137	0.146	0.330
305.0	0.169	0.113	0.096	0.166	0.168	0.166	0.169	0.309
312.0	0.123	0.103	0.063	0.110	0.135	0.110	0.135	0.308
321.0	0.117	0.159	0.080	0.123	0.101	0.117	0.159	0.434
339.0	0.162	0.085	0.137	0.163	0.081	0.137	0.163	0.319
350.0	0.149	0.073	0.129	0.072	0.118	0.118	0.149	0.300
362.0	0.182	0.168	0.194	0.141	0.163	0.168	0.194	0.285
371.0	0.160	0.170	0.219	0.184	0.161	0.170	0.219	0.304
383.0	0.265	0.124	0.168	0.167	0.191	0.168	0.265	0.295
394.0	0.187	0.206	0.191	0.219	0.229	0.206	0.229	0.287
403.0	0.216	0.218	0.180	0.180	0.197	0.197	0.218	0.287

MATERIAL DECOMPOSITION RATE (MDR)
MILS / SECOND

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	AVE.	EXPOSURE TIME
3.5	2.0	1.2	2.0	3.3	2.8	2.3	34.3
13.0	10.7	8.0	6.0	4.4	12.9	8.4	19.4
27.0	0	0	0	0	0	0	4.8
30.7	0	0	0	0	0	0	4.8
34.2	0	0	0	0	0	0	4.2
37.7	0	0	0	0	0	0	3.6
41.2	0	0	0	0	0	0	3.6
44.0	0	0	0	0	0	0	3.0
94.7	0	0	0	0	0	0	0.8
142.0	0	0	0	0	0	0	1.0
145.7	0	0	0	0	0	0	2.0
148.5	0	0	0	0	0	0	10.8
152.0	0	1.1	2.1	0	1.5	0.9	20.7
162.0	4.4	2.7	2.3	3.4	2.2	3.0	44.3
175.5	1.8	1.8	3.5	1.8	2.3	2.2	68.2
187.0	1.8	1.9	2.1	2.1	2.1	2.0	66.4
199.0	2.5	2.1	2.1	2.6	1.6	2.2	66.4
215.0	1.7	1.9	2.0	2.7	2.0	2.1	66.4
224.0	2.9	2.2	2.3	2.3	2.2	2.4	66.4
230.0	2.5	2.0	2.0	2.6	2.4	2.3	66.4
236.0	2.4	2.2	2.8	2.8	2.2	2.5	66.4
240.0	2.4	1.9	2.3	2.3	1.8	2.2	66.4
254.0	2.7	2.2	2.2	1.8	1.9	2.1	66.4
263.0	2.0	2.1	2.2	2.0	1.4	2.0	66.4
282.0	1.7	1.6	2.0	2.0	2.2	1.9	66.4
293.0	2.2	1.9	1.8	2.1	2.1	2.0	66.4
305.0	2.5	1.7	1.4	2.5	2.5	2.1	66.4
312.0	1.9	1.6	0.9	1.7	2.0	1.6	66.4
321.0	1.7	2.2	1.1	1.7	1.4	1.6	70.8
339.0	2.2	1.2	1.9	2.2	1.1	1.7	72.8
350.0	1.9	1.0	1.7	0.9	1.5	1.4	76.6
362.0	2.2	2.1	2.4	1.7	2.0	2.1	81.6
371.0	2.0	2.1	2.7	2.2	2.0	2.2	82.0
383.0	3.0	1.4	1.9	1.9	2.1	2.0	89.4
394.0	2.0	2.2	2.0	2.3	2.4	2.2	94.0
403.0	1.8	1.8	1.5	1.5	1.6	1.6	122.9

MOTOR ACTION TIME = 122.9 SECONDS

A " < " INDICATES THE PRECEDING MDD HAS EXCEEDED THE M + 3 SIGMA DESIGN CRITERIA

TABLE 26
RSRM-7B FORWARD SEGMENT NON-STAR TIP INSULATION PERFORMANCE

PREFIRE MEASUREMENTS INCHES — PART NO. 1U76666-01 SERIAL NO. 0000005

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	MEDIAN	MDT
3.5	2.548	2.512	2.487	2.454	2.490	2.454	2.490	2.120
13.0	0.986	0.916	0.879	0.886	0.998	0.879	0.916	0.650
27.0	0.590	0.594	0.585	0.610	0.630	0.585	0.594	0.450
30.7	0.433	0.443	0.429	0.483	0.432	0.429	0.433	0.400
34.2	0.469	0.475	0.467	0.487	0.477	0.467	0.475	0.380
37.7	0.378	0.393	0.366	0.372	0.375	0.366	0.375	0.330
41.2	0.290	0.298	0.289	0.293	0.292	0.289	0.292	0.280
44.0	0.289	0.301	0.284	0.295	0.289	0.284	0.289	0.250
94.7	0.111	0.107	0.107	0.110	0.110	0.107	0.110	0.090
142.0	0.156	0.163	0.160	0.157	0.156	0.156	0.157	0.113
145.7	0.264	0.260	0.260	0.262	0.261	0.260	0.261	0.234
148.5	0.298	0.324	0.319	0.308	0.327	0.298	0.319	0.276
152.0	0.383	0.370	0.397	0.384	0.386	0.370	0.384	0.317
162.0	0.888	0.821	0.787	0.799	0.789	0.787	0.799	0.547
175.5	0.742	0.732	0.845	0.733	0.750	0.732	0.742	0.604
187.0	0.671	0.680	0.682	0.680	0.669	0.669	0.680	0.640
199.0	0.713	0.725	0.710	0.711	0.710	0.710	0.711	0.643
215.0	0.683	0.672	0.665	0.687	0.663	0.663	0.672	0.639
224.0	0.729	0.712	0.721	0.706	0.711	0.706	0.712	0.639
230.0	0.668	0.650	0.647	0.665	0.665	0.647	0.665	0.639
236.0	0.630	0.630	0.662	0.643	0.621	0.621	0.630	0.578
240.0	0.629	0.628	0.641	0.631	0.613	0.613	0.629	0.574
254.0	0.670	0.618	0.608	0.605	0.618	0.605	0.618	0.568
263.0	0.610	0.608	0.602	0.598	0.594	0.594	0.602	0.568
282.0	0.582	0.602	0.601	0.608	0.615	0.582	0.602	0.568
293.0	0.590	0.610	0.583	0.599	0.590	0.583	0.590	0.546
305.0	0.580	0.592	0.577	0.595	0.599	0.577	0.592	0.525
312.0	0.667	0.668	0.661	0.652	0.647	0.647	0.661	0.541
321.0	0.993	0.996	1.026	1.010	0.966	0.966	0.996	0.918
339.0	0.570	0.579	0.585	0.602	0.563	0.563	0.579	0.551
350.0	0.540	0.537	0.534	0.527	0.534	0.527	0.534	0.523
362.0	0.571	0.578	0.598	0.534	0.561	0.534	0.571	0.520
371.0	0.583	0.604	0.615	0.566	0.554	0.554	0.583	0.520
383.0	0.626	0.546	0.532	0.532	0.548	0.532	0.546	0.511
394.0	0.555	0.610	0.539	0.570	0.636	0.539	0.570	0.503
403.0	1.070	1.067	1.074	1.065	1.073	1.065	1.070	0.950

POSTFIRE MEASUREMENTS INCHES — PART NO. 1U76650-04 SERIAL NO. 0000003

STATION (IN)	DEGREE LOCATIONS 74.0	140.0	206.0	270.0	336.0	MIN.	MEDIAN
3.5	2.478	2.472	2.420	2.342	2.393	2.342	2.420
13.0	0.779	0.761	0.762	0.800	0.748	0.748	0.762
27.0	L	L	L	L	L	L	0.594
30.7	L	L	L	L	L	L	0.433
34.2	L	L	L	L	L	L	0.475
37.7	L	L	L	L	L	L	0.375
41.2	L	L	L	L	L	L	0.292
44.0	L	L	L	L	L	L	0.289
94.7	L	L	L	L	L	L	0.110
142.0	L	L	L	L	L	L	0.157
145.7	L	L	L	L	L	L	0.261
148.5	L	L	L	L	L	L	0.319
152.0	0.400	0.347	0.354	0.418	0.354	0.347	0.354
162.0	0.692	0.700	0.684	0.648	0.691	0.648	0.691
175.5	0.622	0.607	0.605	0.611	0.594	0.594	0.607
187.0	0.552	0.552	0.542	0.541	0.532	0.532	0.542
199.0	0.547	0.584	0.571	0.539	0.603	0.539	0.571
215.0	0.567	0.547	0.531	0.509	0.533	0.509	0.533
224.0	0.538	0.569	0.567	0.551	0.567	0.538	0.567
230.0	0.499	0.516	0.515	0.495	0.505	0.495	0.505
236.0	0.468	0.484	0.473	0.458	0.478	0.458	0.473
240.0	0.467	0.499	0.486	0.479	0.494	0.467	0.486
254.0	0.493	0.474	0.462	0.486	0.494	0.462	0.486
263.0	0.475	0.466	0.459	0.462	0.499	0.459	0.466
282.0	0.470	0.496	0.470	0.473	0.471	0.470	0.471
293.0	0.444	0.481	0.462	0.460	0.453	0.444	0.460
305.0	0.411	0.479	0.481	0.429	0.431	0.411	0.431
312.0	0.544	0.565	0.598	0.542	0.512	0.512	0.544
321.0	0.876	0.837	0.946	0.887	0.865	0.837	0.876
339.0	0.408	0.494	0.448	0.439	0.482	0.408	0.448
350.0	0.391	0.464	0.405	0.455	0.416	0.391	0.416
362.0	0.389	0.410	0.404	0.393	0.398	0.389	0.398
371.0	0.423	0.434	0.396	0.382	0.393	0.382	0.396
383.0	0.361	0.422	0.364	0.365	0.357	0.357	0.364
394.0	0.368	0.404	0.348	0.351	0.407	0.348	0.368
403.0	0.854	0.849	0.894	0.885	0.876	0.849	0.876

AN " L " INDICATES THAT LINER MATERIAL WAS REMAINING AT THAT LOCATION.
THE MEDIAN AND MINIMUM VALUES WERE CALCULATED USING THE PREFIRE THICKNESSES
AT THE LOCATIONS WHERE LINER MATERIAL WAS REMAINING

APPENDIX A

Table A-1
RSRM-7A Aft Dome Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table A-2
RSRM-7A Aft Segment Stiffener to Stiffener Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?	X	yes		no	2
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Minor heat effects on the orbiter side (270°) like normal.

2. Unbond intermittent full circumference on aft edge. Depth 0.8 in. to 0.9 in. typical approx. 70% of circumference. Adhesive failure at 205 to case.

Table A-3
RSRM-7A Aft Segment ET Attach to Stiffener Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table A-4
RSRM-7A Aft Center Segment Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?		yes	X	no	
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

Table A-5
RSRM-7A Forward Center Segment Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Case Unbonds (DEBND)?	____	yes	X	no	____
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

Table A-6
RSRM-7A Forward Segment Cylinder to Cylinder Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Case Unbonds (DEBND)?	____	yes	X	no	____
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

Table A-7
RSRM-7A Forward Dome Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Case Unbonds (DEBND)?	____	yes	X	no	____
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

Table A-8
RSRM-7A Aft Stiffener Ring TPS Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes	____	no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?	____	yes	X	no	____

Notes/Comments:

1. Normal heat effects in 270° region.

Table A-9
RSRM-7A Center Stiffener Ring TPS Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region. Heat effect blisters on outboard face at 270°.

Table A-10
RSRM-7A Forward Stiffener Ring TPS Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table A-11
RSRM-7A Forward Stiffener Stub TPS Evaluation

Motor No.: RSRM-7A	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.
2. KSNA repair of outboard edge of insulation is flaking off intermittently around the circumference.

Table A-12
RSRM-7A Nozzle to Case Joint Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): J. Passman, S. Hicken

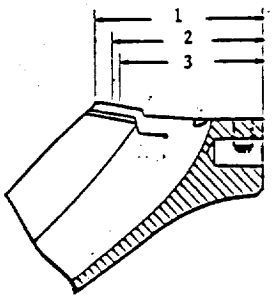
Nozzle to Case Joint Observations:

						Comment Numbers
A.	Gas Penetration in Polysulfide (TBH,PGPTH)?		yes	X	no	
B.	Foreign Material in Polysulfide (FMLJ)?		yes	X	no	
C.	Voids in Polysulfide (VOID)?	X	yes		no	1
D.	Polysulfide Porosity (PSPOR)?	X	yes		no	2
E.	Polysulfide Extrusion Past Wiper O-ring (PSEX)?		yes	X	no	
F.	Polysulfide Failure Mode?	15 % Adhesive to NBR 2 % Adhesive to CCP		83 % Cohesive (CRADH)		

Nozzle to Case Joint Insulation Part Observations:

G.	Aft Dome Edge Unbonds (DBOND)?		yes	X	no	
H.	Baffle Torn (DBAFL)?		yes	X	no	

Record Aft Dome End Nozzle to Case Joint Insulation Measurements:



	Degree Location	Depth (1)*	Depth (2)**	Depth (3)***
	0°	6.95 in.	6.00 in.	5.78 in.
	90°	7.30 in.	6.40 in.	5.90 in.
	180°	7.30 in.	6.25 in.	5.95 in.
	270°	7.35 in.	6.35 in.	5.85 in.
Max				
Min				

* Depth (1) is to be measured from the aft face of the aft dome to the edge of the remaining material
** Depth (2) is to be measured from the aft face of the aft dome to the inboard edge of the heat affected polysulfide
*** Depth (3) is to be measured from the aft face of the aft dome to the outboard edge of the heat affected polysulfide

Notes/Comments:

1. Void in polysulfide at 109° (1.60 in. axial length 0.25 in. wide) extending across step. No sooting present within void.

2. Porosity noted on step full circumference.

Table A-13
RSRM-7A Nozzle to Case Joint Vent Slot Fill

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): J. Passman, S. Hicken	

Degree Location	% Slot Fill	Degree Location	% Slot Fill	Degree Location	% Slot Fill
0.0°	100	122.4°	5	244.8°	10
7.2°	100	129.6°	0	252.0°	20
14.4°	80	136.8°	10	259.2°	40
21.6°	60	144.0°	5	266.4°	0
28.8°	70	151.2°	0	273.6°	30
36.0°	80	158.4°	20	280.8°	20
43.2°	0	165.6°	10	288.0°	20
50.4°	50	172.8°	20	295.2°	20
57.6°	50	180.0°	10	302.4°	20
64.8°	20	187.2°	5	309.6°	80
72.0°	30	194.4°	10	316.8°	100
79.2°	20	202.6°	30	324.0°	100
86.4°	10	208.8°	30	331.2°	80
93.6°	40	216.0°	40	338.4°	90
100.8°	5	223.2°	3	345.6°	100
108.0°	5	230.4°	10	352.8°	90
115.2°	5	237.6°	10		

Average = 32%

4 of 50 slots had 0% fill
5 slots had 100% fill

Table A-14
RSRM-7A Aft Field Joint Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

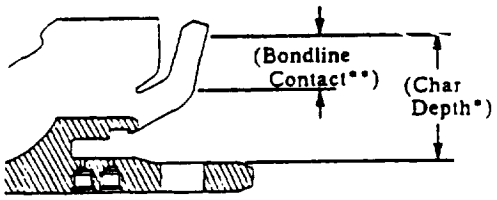
Field Joint Insulation Joint Observations:

						Comment Numbers
A.	Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B.	Foreign Material (FMLJ)?	____	yes	X	no	1
C.	Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D.	Wet Soot (SOOT)?	X	yes	____	no	2

Field Joint Insulation Part Observations:

E.	Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F.	Clevis Insulation Crack/Carzing (CRAZE)?	X	yes	____	no	3

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	2.90 in.	1.00 in.
	90°	2.85 in.	.95 in.
	180°	2.90 in.	1.00 in.
	270°	2.88 in.	.95 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. Clevis edge separation repair adhesive residue on clevis insulation at 245°.
2. Wet sooting present intermittent full circumference approximately 0.30 in. - .40 in. (Unable to verify due to large amounts of grease on tang insulation)
3. Cracks/crazing present on clevis insulation radius region at 310°, 140°, 82°, and 38°.

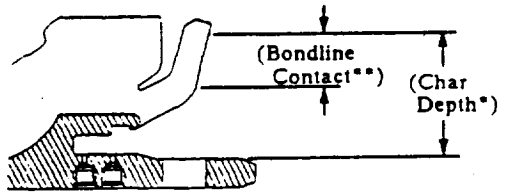
Table A-15
RSRM-7A Center Field Joint Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

Field Joint Insulation Joint Observations:					Comment Numbers
A. Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B. Foreign Material (FMLJ)?	____	yes	X	no	1
C. Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D. Wet Soot (SOOT)?	X	yes	____	no	2
Field Joint Insulation Part Observations:					
E. Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F. Clevis Insulation Crack/Carzing (CRAZE)?	____	yes	X	no	3

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	3.10 in.	1.20 in.
	90°	3.15 in.	1.15 in.
	180°	3.10 in.	1.15 in.
	270°	3.10 in.	1.15 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. Masking tape residue on clevis leg insulation.
2. Wet sooting into joint 0.30 in. - 0.70 in. full circumference.
3. Crazing was to be at 158° (not detectable).

Table A-16
RSRM-7A Forward Field Joint Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

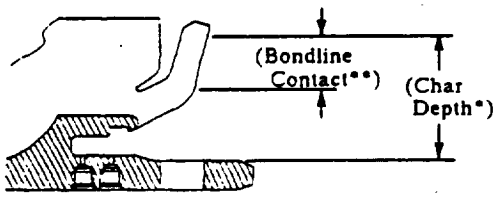
Field Joint Insulation Joint Observations:

						Comment Numbers
A.	Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B.	Foreign Material (FMLJ)?	____	yes	X	no	____
C.	Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D.	Wet Soot (SOOT)?	X	yes	____	no	1

Field Joint Insulation Part Observations:

E.	Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F.	Clevis Insulation Crack/Carzing (CRAZE)?	____	yes	X	no	____

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	3.05 in.	1.15 in.
	90°	3.20 in.	1.20 in.
	180°	3.10 in.	1.20 in.
	270°	3.10 in.	1.10 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. 0.30 in. - 0.60 in. deep full circumference.

2. Intermittent tang edge unbonds visible.

Table A-17
RSRM-7A Igniter Boss Insulation Evaluation

Motor No.: RSRM-7A	Date: 30 November 1989
Assessment Engineer(s): S. Hicken, J. Passman	

Igniter Chamber/Igniter Boss Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____
E. Insulation Flashing (FLASH)?	X	yes	____	no	1
F. Edge Unbonds (DBOND)?	____	yes	X	no	____

Notes/Comments:

1. Small amount of loose flashing near 60° (1 in. circumference).

Table A-18
RSRM-7A Igniter Chamber Insulation Evaluation

Motor No.: RSRM-7A	Date: 30 November 1989
Assessment Engineer(s): S. Hicken, J. Passman	

Igniter Chamber/Igniter Boss Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____

lotes/Comments:

Table A-19
RSRM-7A Igniter Adapter to Forward Dome Putty Evaluation

Motor No.: RSRM-7A	Date: 30 November 1989

Assessment Engineer(s): S. Hicken, J. Passman

Igniter Putty Condition

1. Color?		Variable	X	Constant		
2. Tack?		Good	X	Nominal		Poor

Igniter Putty Observations:

							Comment Numbers
A. Gas Penetration in Putty (TBH, PGPTH)?			X	yes		no	1
B. Foreign Material in Putty (FMLJ)?				yes	X	no	
C. Voids in Putty (VOID)?				yes	X	no	
D. Putty Failure Mode	0	% Adhesve (AFJFM)			100	% Cohesive (CRADH)	

Record the following if any of the above conditions exist:

Condition (Observation Code)	Degree Start Location (deg.)	Degree Stop Location (deg.)	Circumferential Width (in.)	Axial Length (in.)	Radial Depth (in.)
PGPTH	332	332	0.20 at fwd edge 1.15 at aft edge		

Notes/Comments:

1. Blowhole through the putty with gas to the seal at 332°.

Table A-20
RSRM-7A Igniter Adapter to Igniter Chamber Putty Evaluation

Motor No.: RSRM-7A	Date: 30 November 1989

Assessment Engineer(s): S. Hicken, J. Passman

Igniter Putty Condition

1. Color?		Variable	X	Constant		
2. Tack?	X	Good		Nominal		Poor

Igniter Putty Observations:

A. Gas Penetration in Putty (TBH, PGPTH)?		yes	X	no		
B. Foreign Material in Putty (FMIJ)?		yes	X	no		
C. Voids in Putty (VOID)?		yes	X	no		
D. Putty Failure Mode	0	% Adhesve (AFJFM)	100	% Cohesive (CRADH)		

Record the following if any of the above conditions exist:

Condition (Observation Code)	Degree Start Location (deg.)	Degree Stop Location (deg.)	Circumferential Width (in.)	Axial Length (in.)	Radial Depth (in.)

Notes/Comments:

Table A-21
RSRM-7A Aft Segment Internal Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): J. Passman, S. Hicken

Segment Internal Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?		yes	X	no	
B. Tears, Gouges, or Cuts (TEARS)?		yes	X	no	
C. Ply Separations or Delaminations (PLYSP)?		yes	X	no	
D. Blistering (BLSPT)?	X	yes		no	1
E. Abnormal Liner Pattern (ABLNR)?		yes	X	no	2
F. NBR Under CF/EPDM Exposed (INSER)?	X	yes		no	3

Notes/Comments:

1. A small amount of (open and unopen) blistering in the CF/EPDM was present intermittent. Approximate number is 4-6. Worst case near 300° (1.75 in. long x 0.25 in. wide) and it was open. All blisters were located in a region approx. 6-9 in. (surface measurement) forward of remaining aft dome NBR insulation. No abnormal erosion occurred to the blisters or surrounding area.

2. Liner was not present, which is normal.

3. NBR was exposed under the CF/EPDM intermittent just aft of the remaining CF/EPDM to NBR interface approx. 18-23 in. forward of boss. This is normal condition in this region.

Table A-22
RSRM-7A Aft Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

NBR Inhibitor Observations (Other Than Tears):

					Comment Numbers
A. Delaminations or Separations (PLYSP)?	____	yes	X	no	____
B. Severe or Abnormal Erosion (INSER)?	____	yes	X	no	____

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	4.5 in.	180°	7.75 in.
30°	4.5 in.	210°	7.5 in.
60°	5.0 in.	240°	8.5 in.
90°	4.5 in.	270°	4.5 in.
120°	5.5 in.	300°	4.5 in.
150°	6.0 in.	330°	4.5 in.

Max. inhibitor height =
Min. inhibitor height =

Notes/Comments:

Table A-23
RSRM-7A Aft Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

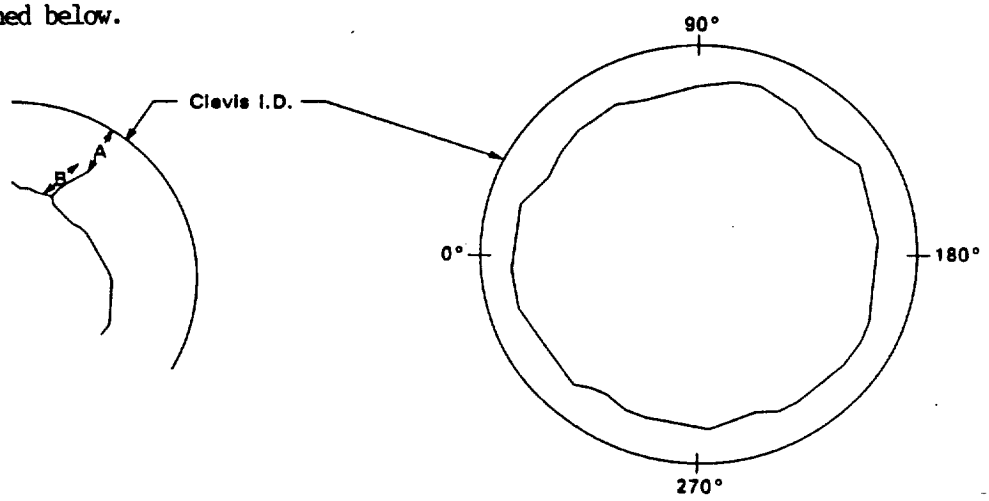
NBR Inhibitor Description

					Comment Numbers
A. Radial Tears > 3 in. Long (TEARS)?	____	yes	X	no	____
B. Circumferential tears?	____	yes	X	no	____
C. Tears exhibiting charring or erosion?	____	yes	X	no	____

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)

* Measurements "A" and "B" are to measured as shown and sketched below.



Notes/Comments:

Table A-24
RSRM-7A Aft Center Segment Internal Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:

					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	
D. Blistering (BLSPT)?	____	yes	X	no	
E. Abnormal Liner Pattern (ABLNR)?	____	yes	X	no	1

Notes/Comments:

1. Liner present in normal condition 1-2 ft. forward of factory joint to NBR inhibitor.

Table A-25
RSRM-7A Aft Center Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

NBR Inhibitor Observations (Other Than Tears):

					Comment Numbers
A. Delaminations or Separations (PLYSP)?	____	yes	X	no	1
B. Severe or Abnormal Erosion (INSER)?	____	yes	X	no	

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	12.0 in.	180°	13.5 in.
30°	13.0 in.	210°	13.0 in.
60°	13.0 in.	240°	12.5 in.
90°	11.5 in.	270°	14.5 in.
120°	13.5 in.	300°	14.5 in.
150°	12.0 in.	330°	12.5 in.

Max. inhibitor height =
Min. inhibitor height =

Notes/Comments:

1. Missing chunks of inhibitor on inboard edge due to splashdown impact (See Figure on Table A-26).

Table A-26
RSRM-7A Aft Center Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

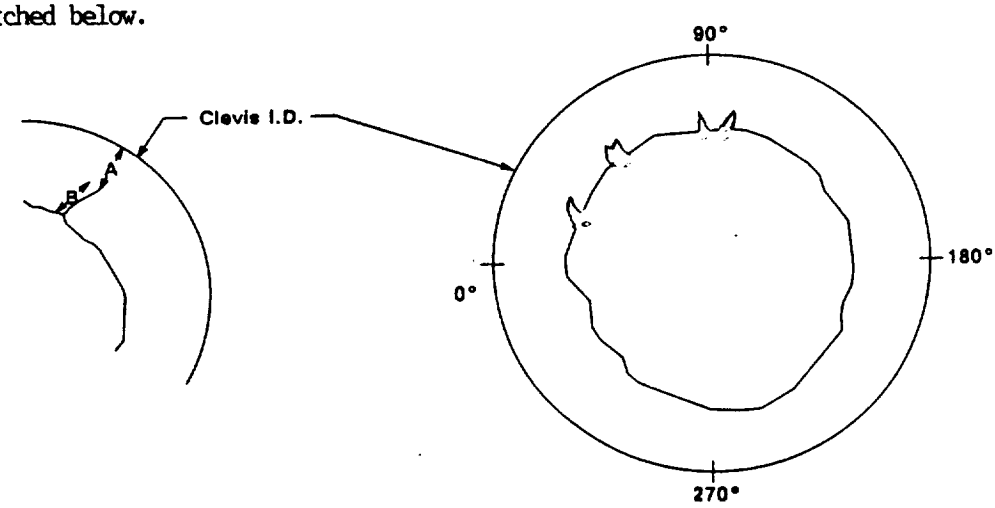
NBR Inhibitor Description

					Comment Numbers
A. Radial Tears > 3 in. Long (TEARS)?	____	yes	X	no	____
B. Circumferential tears?	____	yes	X	no	____
C. Tears exhibiting charring or erosion?	____	yes	X	no	____

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)

* Measurements "A" and "B" are to measured as shown and sketched below.



Notes/Comments:

Table A-27
RSRM-7A Aft Center Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

Stress Relief Flap Region Observations:

						Comment Numbers
A.	Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	
B.	Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	
C.	Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	
D.	Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	
E.	Castable Inhibitor Present?	____	yes	X	no	

Record Stress Relief Flap Measurements:

	Degree Location	Axial Distance	
	0°	15.5 in.	See Comment 1 below
	90°	15.5 in.	
	180°	15.5 in.	
	270°	15.5 in.	
Max. Missing (If Appl.)	____	____	
Min. Missing (If Appl.)	____	____	

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments

1. Flap is eroded uniformly to flap bulb full circumference.

Table A-28
RSRM-7A Forward Center Segment Internal Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:

					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	
D. Blistering (BLSPT)?	____	yes	X	no	
E. Abnormal Liner Pattern (ABLNR)?	____	yes	X	no	1

Notes/Comments:

1. Liner present in normal condition forward of factory joint to NBR inhibitor.

Table A-29
RSRM-7A Forward Center Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

NBR Inhibitor Observations (Other Than Tears):

					Comment Numbers
A. Delaminations or Separations (PLYSP)?	____	yes	X	no	
B. Severe or Abnormal Erosion (INSER)?	____	yes	X	no	

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	24.5 in.	180°	25.25 in.
30°	25.0 in.	210°	25.5 in.
60°	26.5 in.	240°	24.5 in.
90°	27.5 in.	270°	23.75 in.
120°	26.25 in.	300°	24.0 in.
150°	26.75 in.	330°	25.0 in.

Max. inhibitor height =
Min. inhibitor height =

Notes/Comments:

Table A-30
RSRM-7A Forward Center Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

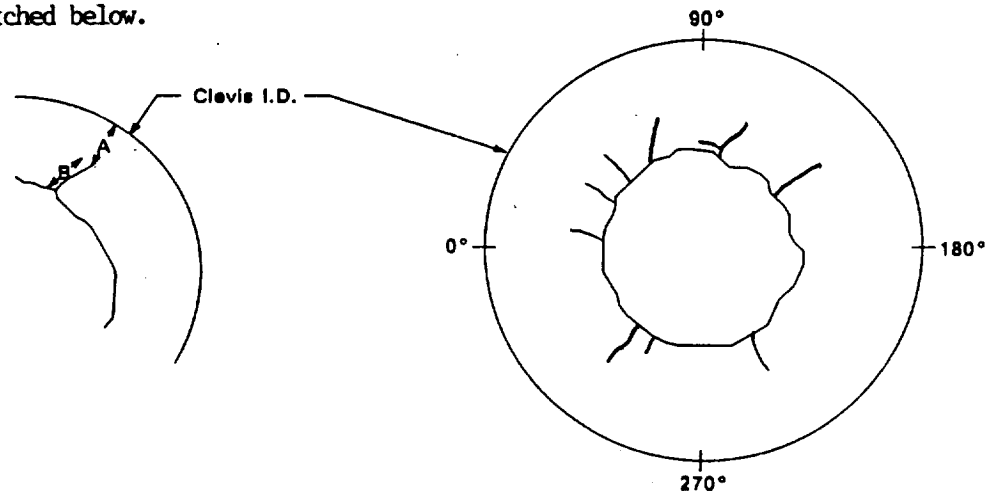
NBR Inhibitor Description

						Comment Numbers
A. Radial Tears > 3 in. Long (TEARS)?	X	yes		no		See Below
B. Circumferential tears?		yes	X	no		
C. Tears exhibiting charring or erosion?		yes	X	no		

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)
10	14.5 in.	7.5 in.	
40	19.0 in.	5.5 in.	
70	18.5 in.	6.5 in.	
87	17.5 in.	8.5 in.	
104	20.0 in.	6.0 in.	
128	14.75 in.	10.5 in.	
244	12.5 in.	11.75 in.	
301	18.0 in.	5.0 in.	
327	15.5 in.	9.0 in.	

* Measurements "A" and "B" are to measured as shown and sketched below.



Notes/Comments:

Table A-31
RSRM-7A Forward Center Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

Stress Relief Flap Region Observations:

						Comment Numbers
A.	Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	1
B.	Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	
C.	Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	
D.	Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	
E.	Castable Inhibitor Present?	____	yes	X	no	

Record Stress Relief Flap Measurements:

	Degree Location	Axial Distance
	0°	10.5 in.
	90°	10.5 in.
	180°	11.5 in.
	270°	11.5 in.
Max. Missing (If Appl.)		
Min. Missing (If Appl.)	186	6.5 in.

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments:

1. Blisters noted in carbon fiber EPDM (54°-80°) (4 in. - 9 in. axially forward of tang).

Table A-32
RSRM-7A Forward Segment Internal Insulation Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____
E. Abnormal Liner Pattern (ABLNR)?	____	yes	X	no	1

Notes/Comments:

1. Eleven star liner pattern evident just aft of cylinder to cylinder factory joint.

Table A-33
RSRM-7A Forward Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7A	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

Stress Relief Flap Region Observations:

						Comment Numbers
A.	Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	
B.	Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	
C.	Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	
D.	Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	
E.	Castable Inhibitor Present?	____	yes	X	no	

Record Stress Relief Flap Measurements:

	Degree Location	Axial Distance	
	0°	7.0 in.	
	90°	3.5 in.	
	180°	3.5 in.	
	270°	3.5 in.	(full flap remaining)
Max. Missing (If Appl.)	____	____	
Min. Missing (If Appl.)	____	____	

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments:

EG MBER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
D HOUSING						
99-01	00	FXD HOUSING	N/A	N/A	0	NOZZLE OVERALL
99-02	00	FXD HOUSING	N/A	N/A	45	NOZZLE OVERALL
99-03	00	FXD HOUSING	N/A	N/A	90	NOZZLE OVERALL
99-04	00	FXD HOUSING	N/A	N/A	135	NOZZLE OVERALL
99-05	00	FXD HOUSING	N/A	N/A	180	NOZZLE OVERALL
99-06	00	FXD HOUSING	N/A	N/A	225	NOZZLE OVERALL
99-07	00	FXD HOUSING	N/A	N/A	270	NOZZLE OVERALL
99-08	00	FXD HOUSING	N/A	N/A	315	NOZZLE OVERALL
99-09	00	FXD HOUSING	N/A	N/A	187	FIXED HOUSING INSULATION FORWARD TIP W/O AND SLAG
99-10	00	FXD HOUSING	N/A	N/A	284	FIXED HOUSING INSULATION FORWARD TIP W/O AND SLAG
01-01	00	FXD HOUSING	N/A	N/A	0	NOZZLE OVERALL
01-02	00	FXD HOUSING	N/A	N/A	90	NOZZLE OVERALL
01-03	00	FXD HOUSING	N/A	N/A	180	NOZZLE OVERALL
01-04	00	FXD HOUSING	N/A	N/A	270	NOZZLE OVERALL
T SEG						
197-03	33	AFT SEG	NOZZLE/CASE JNT	AFT DOME	240-0	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
197-02	32	AFT SEG	NOZZLE/CASE JNT	AFT DOME	120-240	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
197-01	31	AFT SEG	NOZZLE/CASE JNT	AFT DOME	0-120	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
193-04	25	AFT SEG	AFT FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
193-03	24	AFT SEG	AFT FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
193-02	23	AFT SEG	AFT FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
493-01	22	AFT SEG	AFT FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION
493-08	21	AFT SEG	AFT FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
493-07	20	AFT SEG	AFT FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
493-06	19	AFT SEG	AFT FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
493-05	18	AFT SEG	AFT FIELD JNT	TANG	360	FLAP, CYLINDER REGION, AND TANG
470-01	00	AFT SEG	STIFF/STIFF FACT JNT	N/A	270	WEATHERSEAL UNBOND
470-02	00	AFT SEG	STIFF/STIFF FACT JNT	N/A	270	WEATHERSEAL UNBOND
511-02	00	AFT SEG	STIFF/STIFF FACT JNT	N/A	270	AFT SEGMENT WEATHERSEAL UNBOND
496-05	00	AFT SEG	N/A	AFT DOME	0-120	AFT DOME
496-06	00	AFT SEG	N/A	AFT DOME	120-240	AFT DOME

EG MBER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
96-07	00	AFT SEG	N/A	AFT DOME	120-240	AFT DOME
96-08	00	AFT SEG	N/A	AFT DOME	240-0	AFT DOME
T CTR SEG						
94-04	17	AFT CTR SEG	CTR FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
82-12	17	AFT CTR SEG	CTR FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
94-03	16	AFT CTR SEG	CTR FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
82-11	16	AFT CTR SEG	CTR FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
94-02	15	AFT CTR SEG	CTR FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
82-10	15	AFT CTR SEG	CTR FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
94-01	14	AFT CTR SEG	CTR FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION
82-09	14	AFT CTR SEG	CTR FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION
WD CTR SEG						
94-08	13	FWD CTR SEG	CTR FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
82-08	13	FWD CTR SEG	CTR FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
94-07	12	FWD CTR SEG	CTR FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
82-07	12	FWD CTR SEG	CTR FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
94-06	11	FWD CTR SEG	CTR FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
82-06	11	FWD CTR SEG	CTR FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
94-05	10	FWD CTR SEG	CTR FIELD JNT	TANG	360	FLAP, CYLINDER REGION, AND TANG
89-10	09	FWD CTR SEG	FWD FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
89-09	08	FWD CTR SEG	FWD FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
89-08	07	FWD CTR SEG	FWD FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
89-07	06	FWD CTR SEG	FWD FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION
WD SEG						
89-06	05	FWD SEG	FWD FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
89-05	04	FWD SEG	FWD FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
89-03	03	FWD SEG	FWD FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
89-02	02	FWD SEG	FWD FIELD JNT	TANG	360	INTERNAL INSULATION AND TANG
89-01	01	FWD SEG	FWD FIELD JNT	FWD DOME	360	FORWARD DOME AND CYLINDER REGION

Table A-34 (Cont)

EG MBER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
82-01	00	FWD SEG	IGNITER/CASE JNT	FWD DOME	360	FORWARD DOME PRIOR TO IGNITER REMOVAL
82-02	00	FWD SEG	IGNITER/CASE JNT	FWD DOME	360	FORWARD DOME PRIOR TO IGNITER REMOVAL
83-07	00	FWD SEG	IGNITER/CASE JNT	FWD DOME	360	FORWARD DOME AFTER IGNITER REMOVAL
08-01	00	FWD SEG	N/A	FWD DOME	0-90	IGNITER BOOT REMOVED FROM FORWARD DOME
08-02	00	FWD SEG	N/A	FWD DOME	90-180	IGNITER BOOT REMOVED FROM FORWARD DOME
08-03	00	FWD SEG	N/A	FWD DOME	180-270	IGNITER BOOT REMOVED FROM FORWARD DOME
08-04	00	FWD SEG	N/A	FWD DOME	270-0	IGNITER BOOT REMOVED FROM FORWARD DOME
08-05	00	FWD SEG	N/A	FWD DOME	360	IGNITER BOOT REMOVED FROM FORWARD DOME
96-04	00	FWD SEG	N/A	N/A	360	IGNITER BOOT INSULATION
NITER						
83-03	00	IGNITER	N/A	N/A	0	IGNITER
83-04	00	IGNITER	N/A	N/A	180	IGNITER
83-05	00	IGNITER	N/A	N/A	332	PUTTY BLOWHOLE
83-06	00	IGNITER	N/A	N/A	332	PUTTY BLOWHOLE
84-03	00	IGNITER	N/A	N/A		IGNITER NOZZLE INSERT
86-07	00	IGNITER	N/A	N/A	360	PUTTY ON ADAPTER SURFACE INTERMITTENT
87-03	00	IGNITER	N/A	N/A	360	IGNITER ADAPTER PLATE
87-04	00	IGNITER	N/A	N/A	360	IGNITER CHAMBER

END OF REPORT

APPENDIX B

Table B-1
RSRM-7B Aft Dome Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table B-2
RSRM-7B Aft Segment Stiffener to Stiffener Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table B-3
RSRM-7B Aft Segment ET Attach to Stiffener Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

1. Normal light heat effects in 270° region.

Table B-4
RSRM-7B Aft Center Segment Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?		yes	X	no	
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Case Unbonds (DEBND)?		yes	X	no	
E. Evidence of Water Leakage From Factory Joint (WATER)?		yes	X	no	

Notes/Comments:

Table B-5
RSRM-7B Forward Center Segment Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	X	yes	____	no	1
D. Insulation to Case Unbonds (DEBND)?	____	yes	X	no	____
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

1. Missing material at 270° on aft edge. Measures approx. 2 in. circ. by 1 in. long.

Table B-6
RSRM-7B Forward Segment Cylinder to Cylinder Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Case Unbonds (DEBND)?	X	yes	____	no	1
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

1. Three edge separations:

   One at 160° on forward edge 1 in. to 1.5 in. deep, 14 in. circ., open 0.1 in., paint missing forward of weatherseal. Missing paint measures 2.4 in. long by 5 in. circ. and 3.25 in. long by 7 in. circ.

   One at 210° on aft edge 0.6 in. long by 1 in. circ. Adhesive failure at Chemlok 205 to case.

   One unbond at 135° 11 in. circ. on forward edge 0.1 in. deep.

Table B-7
RSRM-7B Forward Dome Factory Joint Weatherseal Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Factory Joint Weatherseal Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	____	yes	X	no	____
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Case Unbonds (DEBND)?	____	yes	X	no	____
E. Evidence of Water Leakage From Factory Joint (WATER)?	____	yes	X	no	____

Notes/Comments:

Table B-8
RSRM-7B Aft Stiffener Ring TPS Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes	____	no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?	____	yes	X	no	____
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?	____	yes	X	no	____
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?	____	yes	X	no	____

Notes/Comments:

1. Normal heat effects in 270° region. Blisters (heat effect) on outboard face at 270°.

Table B-9
RSRM-7B Center Stiffener Ring TPS Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table B-10
RSRM-7B Forward Stiffener Ring TPS Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region.

Table B-11
RSRM-7B Forward Stiffener Stub TPS Evaluation

Motor No.: RSRM-7B	Date: 26 November 1989
Assessment Engineer(s): S. Hicken, T. Morgan	

Stiffener Ring/Stiffener Stub Insulation Observations:					Comment Numbers
A. Charred/Heat Affected Material (HTAFF)?	X	yes		no	1
B. Insulation Damage/Missing Material Not Due to Reentry/Debris/Water Impact (TPSVD)?		yes	X	no	
C. Insulation Damage/Missing Material Due to Reentry/Debris/Water Impact (TPSDM)?		yes	X	no	
D. Insulation to Stiffener Ring/Stiffener Stub Unbonds (DEBND)?		yes	X	no	

Notes/Comments:

1. Normal heat effects in 270° region. KSNA repair of outboard edge was broken off intermittently around the circumference.

Table B-12
RSRM-7B Nozzle to Case Joint Insulation Evaluation

Motor No.: RSRM-7B	Date: 2 December 1989

Assessment Engineer(s): J. Passman, S. Hicken

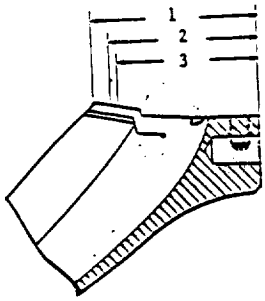
Nozzle to Case Joint Observations:

						Comment Numbers
A. Gas Penetration in Polysulfide (TBH,PGPTH)?	____	yes	X	no		____
B. Foreign Material in Polysulfide (FMLJ)?	____	yes	X	no		____
C. Voids in Polysulfide (VOID)?	____	yes	X	no		____
D. Polysulfide Porosity (PSPOR)?	X	yes	____	no		1
E. Polysulfide Extrusion Past Wiper O-ring (PSEX)?	____	yes	X	no		2
F. Polysulfide Failure Mode?	10	% Adhesive to NBR	89	% Cohesive (CRADH)		
	1	% Adhesive to CCP				

Nozzle to Case Joint Insulation Part Observations:

G. Aft Dome Edge Unbonds (DBOND)?	____	yes	X	no	____
H. Baffle Torn (DBAFL)?	____	yes	X	no	3

Record Aft Dome End Nozzle to Case Joint Insulation Measurements:



	Degree Location	Depth (1)*	Depth (2)**	Depth (3)***
	0°	6.75 in.	5.95 in.	5.60 in.
	90°	7.00 in.	6.10 in.	5.60 in.
	180°	7.00 in.	6.10 in.	5.70 in.
	270°	7.00 in.	6.05 in.	5.70 in.
Max	____	____	____	____
Min	____	____	____	____

* Depth (1) is to be measured from the aft face of the aft dome to the edge of the remaining material

** Depth (2) is to be measured from the aft face of the aft dome to the inboard edge of the heat affected polysulfide

*** Depth (3) is to be measured from the aft face of the aft dome to the outboard edge of the heat affected polysulfide

Notes/Comments:

1. Slight porosity showing in the polysulfide in the step region.

2. Polysulfide showing past wiper, only at vent slot locations; normal condition due to large amount of polysulfide in joint.

3. Baffle was not torn (prefire DR condition as a result of nozzle removal repaired). Baffle was pulled up at the CF/EPDM to NBR bondlines full circ. It was pulled aft all the way back to the polysulfide as indicated by black marks on the adhesive. This is a result of disassembly where excess charred polysulfide on the fixed housing caught on the baffle at disassembly.

Table B-13
RSRM-7B Nozzle to Case Joint Vent Slot Fill

Motor No.: RSRM-7B	Date: 2 December 1989

Assessment Engineer(s): J. Passman, S. Hicken

Degree Location	% Slot Fill	Degree Location	% Slot Fill	Degree Location	% Slot Fill
0.0°	100	122.4°	80	244.8°	90
7.2°	100	129.6°	100	252.0°	60
14.4°	100	136.8°	80	259.2°	100
21.6°	100	144.0°	95	266.4°	30
28.8°	100	151.2°	50	273.6°	70
36.0°	100	158.4°	100	280.8°	60
43.2°	100	165.6°	100	288.0°	100
50.4°	100	172.8°	100	295.2°	60
57.6°	100	180.0°	100	302.4°	50
64.8°	100	187.2°	100	309.6°	100
72.0°	100	194.4°	100	316.8°	60
79.2°	100	202.6°	100	324.0°	50
86.4°	100	208.8°	50	331.2°	100
93.6°	80	216.0°	60	338.4°	60
100.8°	60	223.2°	100	345.6°	40
108.0°	60	230.4°	30	352.8°	100
115.2°	100	237.6°	100		

Average = 84%

0 of 50 slots had 0% fill
29 slots had 100% fill

Table B-14
RSRM-7B Aft Field Joint Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

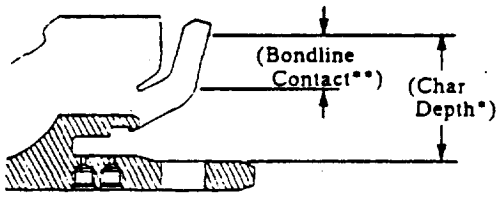
Field Joint Insulation Joint Observations:

						Comment Numbers
A.	Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B.	Foreign Material (FMLJ)?	____	yes	X	no	1
C.	Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D.	Wet Soot (SOOT)?	X	yes	____	no	2,3

Field Joint Insulation Part Observations:

E.	Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F.	Clevis Insulation Crack/Carzing (CRAZE)?	X	yes	____	no	4

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	2.85 in.	0.80 in.
	90°	2.90 in.	0.95 in.
	180°	2.90 in.	0.95 in.
	270°	2.88 in.	1.15 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. Tape adhesive residue intermittent full circumference on clevis insulation.
2. Water line smudge marks 286°-296° and 246°-254° due to disassembly.
3. 0.20 - 0.70 in. intermittent full circumference. Maximum condition 182° - 176° 0.90.
4. 0°, 10°-14°, 35°-42°, 52°, 82°-100°, 165°, 224°, 342°-338° cracks in radius region of clevis insulation.

Table B-15
RSRM-7B Center Field Joint Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

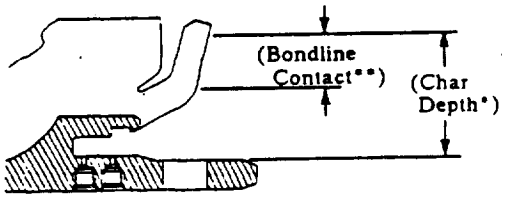
Field Joint Insulation Joint Observations:

						Comment Numbers
A.	Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B.	Foreign Material (FMIJ)?	____	yes	X	no	1
C.	Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D.	Wet Soot (SOOT)?	X	yes	____	no	2

Field Joint Insulation Part Observations:

E.	Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F.	Clevis Insulation Crack/Carzing (CRAZE)?	X	yes	____	no	3

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	3.10 in.	1.25 in.
	90°	3.10 in.	1.15 in.
	180°	3.15 in.	1.0 in.
	270°	3.10 in.	1.15 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. Clevis edge separation repair adhesive noted on insulation surface 2.1 in. from tip of clevis at 260°, 265°, 292°, 295°, 296°, and 298°.

2. Maximum condition 1.35 in. at 166°-182°, 0.30 in. - 0.70 in. full circumference.

3. Intermittent from 30°-180°-250°.

Table B-16
RSRM-7B Forward Field Joint Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

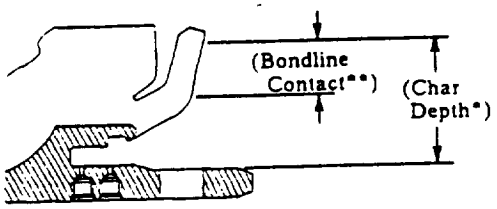
Field Joint Insulation Joint Observations:

						Comment Numbers
A.	Gas Penetration (TBH, PGPTH)?	____	yes	X	no	____
B.	Foreign Material (FMLJ)?	____	yes	X	no	1
C.	Areas of J-leg Non-contact (BLCNT)?	____	yes	X	no	____
D.	Wet Soot (SOOT)?	X	yes	____	no	2

Field Joint Insulation Part Observations:

E.	Clevis Edge Unbonds > 0.10 in. Deep (DBOND)?	____	yes	X	no	____
F.	Clevis Insulation Crack/Carzing (CRAZE)?	X	yes	____	no	3

Record Tang End Field Joint Insulation Measurements:



	Degree Location	Char Depth*	Bondline Contact**
	0°	3.20 in.	1.05 in.
	90°	3.19 in.	1.05 in.
	180°	3.20 in.	1.10 in.
	270°	3.15 in.	1.25 in.
Max	____	____	____
Min	____	____	____

* Char depth is to be measured from the inner diameter of the tang leg to the outbard edge of the char layer.

** Bondline contact is to be measured from the outboard edge of the char layer to the outboard extent of contact.

Notes/Comments:

1. Masking tape residue on clevis leg insulation.
2. 0.30 in. - 0.50 in. deep full circumference. (Max. 0.80 at 134°)
3. Crack exists intermittently around circumference form 300°-0°-220°. Not open and did not affect function of the joint (prefire P.R. condition).

Table B-17
RSRM-7B Igniter Boss Insulation Evaluation

Motor No.: RSRM-7B	Date: 30 November 1989
Assessment Engineer(s): S. Hicken, J. Passman	

Igniter Chamber/Igniter Boss Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____
E. Insulation Flashing (FLASH)?	X	yes	____	no	1
F. Edge Unbonds (DBOND)?	____	yes	X	no	____

lotes/Comments:

1. Intermittent loose flashing between 200°-270°-20°. Maximum length of 0.075 in.

Table B-18
RSRM-7B Igniter Chamber Insulation Evaluation

Motor No.: RSRM-7B	Date: 30 November 1989
Assessment Engineer(s): S. Hicken, J. Passman	

Igniter Chamber/Igniter Boss Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____

otes/Comments:

Table B-19
RSRM-7B Igniter Adapter to Forward Dome Putty Evaluation

Motor No.: RSRM-7B	Date: 30 November 1989

Assessment Engineer(s): S. Hicken, J. Passman

Igniter Putty Condition

1. Color?	____	Variable	X	Constant	
2. Tack?	____	Good	X	Nominal	____ Poor

Igniter Putty Observations:

					Comment Numbers
A. Gas Penetration in Putty (TBH, PGPTH)?	____	yes	X	no	
B. Foreign Material in Putty (FMLJ)?	____	yes	X	no	
C. Voids in Putty (VOID)?	____	yes	X	no	
D. Putty Failure Mode	0	% Adhesve (AFJFM)	100	% Cohesive (CRADH)	

Record the following if any of the above conditions exist:

Condition (Observation Code)	Degree Start Location (deg.)	Degree Stop Location (deg.)	Circumferential Width (in.)	Axial Length (in.)	Radial Depth (in.)

Notes/Comments:

1. Putty was present up to and intermittently on the adapter.

Table B-20
RSRM-7B Igniter Adapter to Igniter Chamber Putty Evaluation

Motor No.: RSRM-7B	Date: 30 November 1989

Assessment Engineer(s): S. Hicken, J. Passman

Igniter Putty Condition

1. Color?	____	Variable	X	Constant		
2. Tack?	____	Good	X	Nominal	____	Poor

Igniter Putty Observations:

A. Gas Penetration in Putty (TBH, PGPTH)?	X	yes	____	no	1	
B. Foreign Material in Putty (FMLJ)?	____	yes	X	no	____	
C. Voids in Putty (VOID)?	____	yes	X	no	____	
D. Putty Failure Mode	0	% Adhesve (AFJFM)	100	% Cohesive (CRADH)		

Record the following if any of the above conditions exist:

Condition (Observation Code)	Degree Start Location (deg.)	Degree Stop Location (deg.)	Circumferential Width (in.)	Axial Length (in.)	Radial Depth (in.)
PGPTH			0.525 at aft edge		
			0.50 at fwd edge		

Notes/Comments:

1. Blowhole at 340°. Soot in putty from 315° to 350°.

Table B-21
RSRM-7B Aft Segment Internal Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): J. Passman, S. Hicken	

Segment Internal Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?		yes	X	no	
B. Tears, Gouges, or Cuts (TEARS)?	X	yes		no	1
C. Ply Separations or Delaminations (PLYSP)?		yes	X	no	
D. Blistering (BLSPT)?		yes	X	no	2
E. Abnormal Liner Pattern (ABLNR)?		yes	X	no	3
F. NBR Under CF/EPDM Exposed (INSER)?	X	yes		no	4

Notes/Comments:

1. Scratches and scuff marks from splashdown debris impact 0°-45° from dome factory joint to NBR inhibitor. Small cut with peeled up insulation in the CF/EPDM in the aft dome at 215°, located 15 in. forward of nozzle boss measuring 3.1 in. circ. x 2.7 in. long. Triangular in shape with peeled up insulation ~ 0.05 in. thick. Scrapes were present indicating debris impact caused this.

2. No blisters were present in aft dome CF/EPDM.

3. No liner present which is normal.

4. NBR under CF/EPDM was exposed in 4-5 places throughout circumference just aft of the remaining CF/EPDM to NBR interface; approx. 15-20 in. from boss. This is normal condition.

Table B-22
RSRM-7B Aft Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

NBR Inhibitor Observations (Other Than Tears):

					Comment Numbers
A. Delaminations or Separations (PLYSP)?	____	yes	X	no	____
B. Severe or Abnormal Erosion (INSER)?	____	yes	X	no	____

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	8.5 in.	180°	6.0 in.
30°	7.0 in.	210°	5.0 in.
60°	7.5 in.	240°	5.5 in.
90°	5.5 in.	270°	4.5 in.
120°	3.5 in.	300°	7.5 in.
150°	4.0 in.	330°	9.0 in.

Max. inhibitor height =
Min. inhioitor height =

Notes/Comments:

Table B-23
RSRM-7B Aft Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

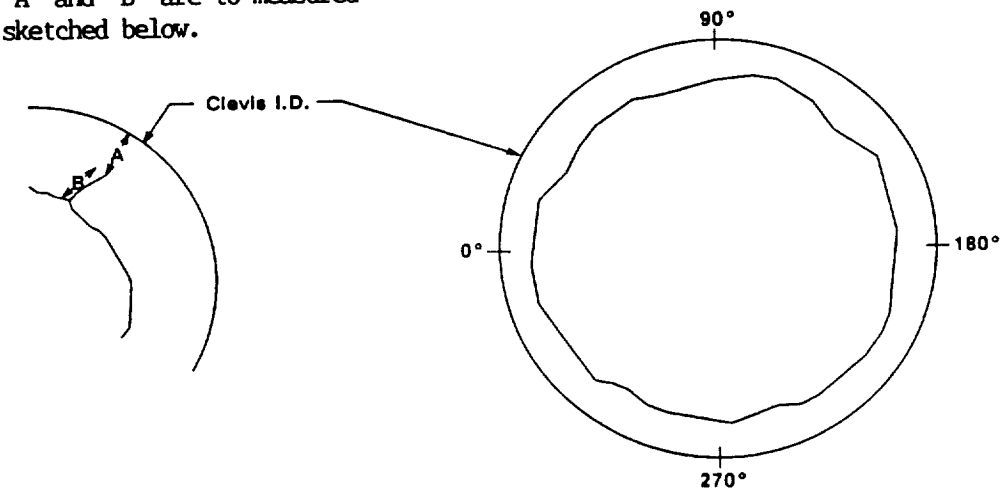
NBR Inhibitor Description

					Comment Numbers
A. Radial Tears > 3 in. Long (TEARS)?	____	yes	X	no	____
B. Circumferential tears?	____	yes	X	no	____
C. Tears exhibiting charring or erosion?	____	yes	X	no	____

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)

* Measurements "A" and "B" are to measured as shown and sketched below.



Notes/Comments:

Table B-24
RSRM-7B Aft Center Segment Internal Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:

						Comment Numbers
A.	Abnormal Insulation Erosion (INSER)?		yes	X	no	
B.	Tears, Gouges, or Cuts (TEARS)?	X	yes		no	1
C.	Ply Separations or Delaminations (PLYSP)?		yes	X	no	
D.	Blistering (BLSPT)?		yes	X	no	
E.	Abnormal Liner Pattern (ABLNR)?		yes	X	no	2

Notes/Comments:

1. Scratches and scuff marks from splashdown debris impact 0°-30° full length of segment.

2. Liner present normally 2-3 ft. forward of factory joint to NBR inhibitor.

Table B-25
RSRM-7B Aft Center Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

NBR Inhibitor Observations (Other Than Tears):

						Comment Numbers
A.	Delaminations or Separations (PLYSP)?		yes	X	no	
B.	Severe or Abnormal Erosion (INSER)?		yes	X	no	

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	14.0 in.	180°	12.5 in.
30°	14.5 in.	210°	14.0 in.
60°	15.0 in.	240°	13.5 in.
90°	12.5 in.	270°	13.0 in.
120°	11.0 in.	300°	15.0 in.
150°	12.5 in.	330°	13.0 in.

Max. inhibitor height =
Min. inhibitor height =

Notes/Comments:

Table B-26
RSRM-7B Aft Center Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

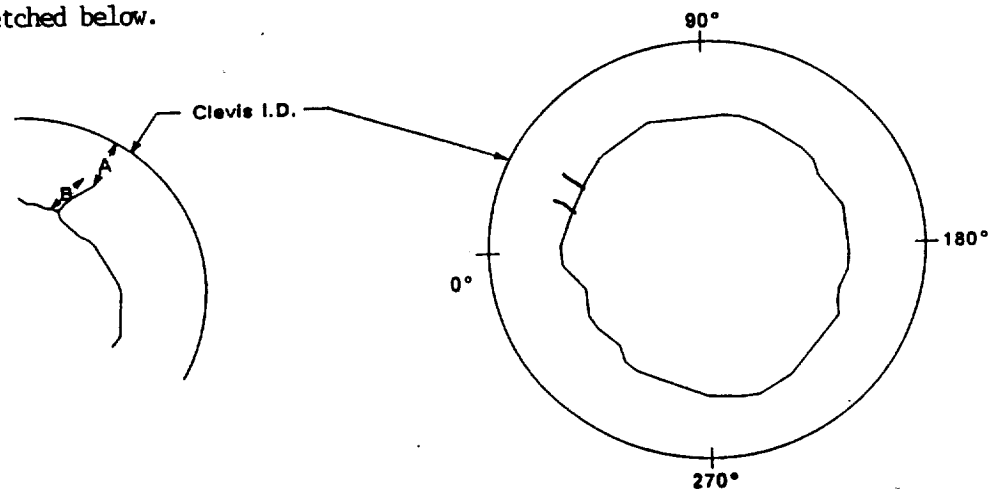
NBR Inhibitor Description

					Comment Numbers See Below
A. Radial Tears > 3 in. Long (TEARS)?	X	yes		no	
B. Circumferential tears?		yes	X	no	
C. Tears exhibiting charring or erosion?		yes	X	no	

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)
9	10.0 in.	4.5 in.	
18	10.5 in.	4.0 in.	

* Measurements "A" and "B" are to measured as shown and sketched below.



lotes/Comments:

Table B-27
RSRM-7B Aft Center Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

Stress Relief Flap Region Observations:

						Comment Numbers
A.	Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	
B.	Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	
C.	Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	
D.	Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	
E.	Castable Inhibitor Present?	____	yes	X	no	

Record Stress Relief Flap Measurements:

Degree Location	Axial Distance	
0°	16.0 in.	See Comment 1 below
90°	16.0 in.	
180°	16.0 in.	
270°	16.0 in.	
Max. Missing (If Appl.) ____		
Min. Missing (If Appl.) ____		

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments

1. Flap is eroded back to flap bulb full circumference.

Table B-28
RSRM-7B Forward Center Segment Internal Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:

					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	X	yes	____	no	1
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____
E. Abnormal Liner Pattern (ABLNR)?	____	yes	X	no	2

Notes/Comments:

1. Scratches and scuff marks from splashdown debris impact 350°-355°-0° full length of segment.

2. Liner present normally slightly forward of factory joint to NBR inhibitor.

Table B-29
RSRM-7B Forward Center Segment NBR Inhibitor Height Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

NBR Inhibitor Observations (Other Than Tears):

					Comment Numbers
A. Delaminations or Separations (PLYSP)?	____	yes	X	no	____
B. Severe or Abnormal Erosion (INSER)?	____	yes	X	no	____

Record NBR Inhibitor Measurements:

Degree Location	Radial Distance	Degree Location	Radial Distance
0°	26.5 in.	180°	26.0 in.
30°	25.0 in.	210°	27.0 in.
60°	27.5 in.	240°	24.5 in.
90°	25.5 in.	270°	24.0 in.
120°	24.0 in.	300°	24.5 in.
150°	26.0 in.	330°	24.5 in.

Max. inhibitor height =
Min. inhibitor height =

Notes/Comments:

Table B-30
RSRM-7B Forward Center Segment NBR Inhibitor Tear Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

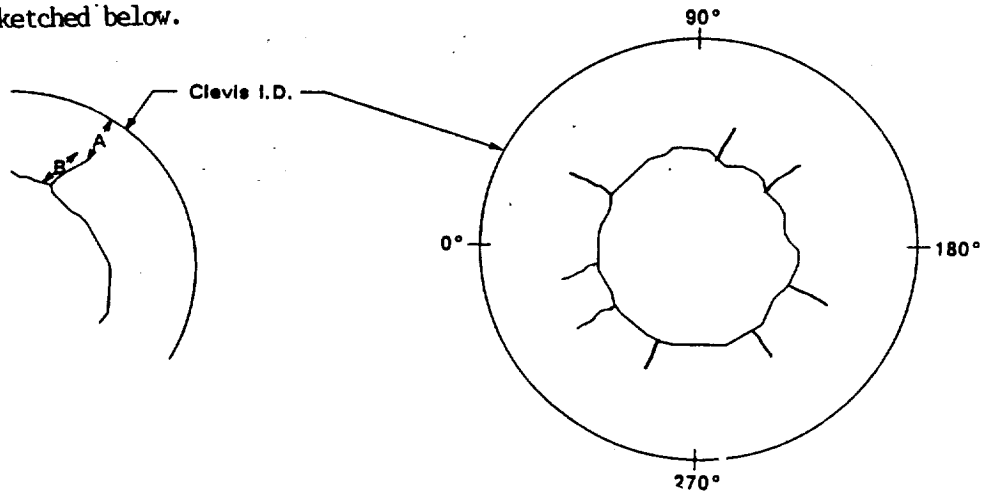
NBR Inhibitor Description

					Comment Numbers See Below
A. Radial Tears > 3 in. Long (TEARS)?	X	yes		no	
B. Circumferential tears?		yes	X	no	
C. Tears exhibiting charring or erosion?		yes	X	no	

Record NBR Inhibitor Tear Measurements (if applicable, for radial tears > 3 in. long or circ. tears):

Degree Location	Meas. "A"*	Meas. "B"*	Comments (Charring, etc.)
31	17.0 in.	8.5 in.	
105	17.0 in.	8.0 in.	
136	15.0 in.	9.0 in.	
190	14.5 in.	11.5 in.	
240	18.0 in.	6.5 in.	
291	14.5 in.	9.5 in.	
334	13.5 in.	11.5 in.	
354	17.5 in.	7.5 in.	

* Measurements "A" and "B" are to measured as shown and sketched below.



Notes/Comments:

Table B-31
RSRM-7B Forward Center Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989

Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt

Stress Relief Flap Region Observations:

						Comment Numbers
A.	Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	1
B.	Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	
C.	Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	
D.	Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	
E.	Castable Inhibitor Present?	____	yes	X	no	

Record Stress Relief Flap Measurements:

	Degree Location	Axial Distance
	0°	11.25 in.
	90°	10.0 in.
	180°	7.0 in.
	270°	6.5 in.
Max. Missing (If Appl.)	____	____
Min. Missing (If Appl.)	____	____

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments:

1. Small blisters (closed) in carbon fiber intermittent full circumference.

Table B-32
RSRM-7B Forward Segment Internal Insulation Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): J. Passman	

Segment Internal Insulation Observations:					Comment Numbers
A. Abnormal Insulation Erosion (INSER)?	____	yes	X	no	____
B. Tears, Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations or Delaminations (PLYSP)?	____	yes	X	no	____
D. Blistering (BLSPT)?	____	yes	X	no	____
E. Abnormal Liner Pattern (ABLNR)?	____	yes	X	no	1

Notes/Comments:

1. Eleven star pattern evident 6-12 in. aft of cylinder to cylinder factory joint.

Table B-33
RSRM-7B Forward Segment Stress Relief Flap Evaluation

Motor No.: RSRM-7B	Date: 1 December 1989
Assessment Engineer(s): S. Hicken, J. Passman, D. Bartelt	

Stress Relief Flap Region Observations:

					Comment Numbers
A. Abnormal CF/EPDM or NBR Erosion (INSER)?	____	yes	X	no	____
B. Tears Gouges, or Cuts (TEARS)?	____	yes	X	no	____
C. Ply Separations, Delaminations, or Voids (PLYSP)?	____	yes	X	no	____
D. Abnormal/Unusual Missing Material (MISS)?	____	yes	X	no	1
E. Castable Inhibitor Present?	____	yes	X	no	____

Record Stress Relief Flap Measurements:

	Degree Location	Axial Distance	
	0°	3.5 in.	(full flap remaining)
	90°	3.5 in.	
	180°	3.5 in.	
	270°	4.0 in.	
Max. Missing (If Appl.)	____	____	
Min. Missing (If Appl.)	____	____	

Record Stress Relief Flap Tear Measurements (If Applicable):

Degree Location	Measurement "A"**	Measurement "B"***	Comments (Charring, etc.)

* Axial distance is to be measured from the tip of the tang to the aft edge of the flap.
** Measurement "A" is to be taken from the tip of the tang to the aft edge of the flap.
*** Measurement "B" is to be taken from the aft edge of the flap to the forward edge of the tear.

Notes/Comments:

1. 210°-214° area of erosion (10 in. maximum). 168° area of erosion (11 in. maximum).

G BER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
HOUSING						
4-01	00	FXD HOUSING	NOZZLE/CASE JNT	CLEVIS	354.6	O-RING DAMAGE (POLYSULFIDE)
4-02	00	FXD HOUSING	NOZZLE/CASE JNT	CLEVIS	52.2	O-RING DAMAGE (POLYSULFIDE)
4-03	00	FXD HOUSING	NOZZLE/CASE JNT	CLEVIS	354.6	O-RING DAMAGE (POLYSULFIDE)
4-04	00	FXD HOUSING	NOZZLE/CASE JNT	CLEVIS	354.6	O-RING DAMAGE (POLYSULFIDE)
4-05	00	FXD HOUSING	NOZZLE/CASE JNT	CLEVIS	354.6	O-RING DAMAGE (POLYSULFIDE)
9-01	00	FXD HOUSING	N/A	N/A	0	NOZZLE OVERALL
9-03	00	FXD HOUSING	N/A	N/A	90	NOZZLE OVERALL
9-04	00	FXD HOUSING	N/A	N/A	180	NOZZLE OVERALL
9-05	00	FXD HOUSING	N/A	N/A	270	NOZZLE OVERALL
10-01	00	FXD HOUSING	N/A	N/A	0	NOZZLE OUTER BOOT RING - AFT TIP
10-02	00	FXD HOUSING	N/A	N/A	45	NOZZLE OUTER BOOT RING - AFT TIP
10-03	00	FXD HOUSING	N/A	N/A	90	NOZZLE OUTER BOOT RING - AFT TIP
10-04	00	FXD HOUSING	N/A	N/A	135	NOZZLE OUTER BOOT RING - AFT TIP
10-05	00	FXD HOUSING	N/A	N/A	180	NOZZLE OUTER BOOT RING - AFT TIP
10-06	00	FXD HOUSING	N/A	N/A	225	NOZZLE OUTER BOOT RING - AFT TIP
10-07	00	FXD HOUSING	N/A	N/A	270	NOZZLE OUTER BOOT RING - AFT TIP
10-08	00	FXD HOUSING	N/A	N/A	315	NOZZLE OUTER BOOT RING - AFT TIP
T SEG						
05-06	00	AFT SEG	NOZZLE/CASE JNT	AFT DOME	0-120	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
05-07	00	AFT SEG	NOZZLE/CASE JNT	AFT DOME	120-240	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
05-08	00	AFT SEG	NOZZLE/CASE JNT	AFT DOME	240-0	NOZZLE BOSS, AFT DOME, AND CYLINDER REGION
06-01	00	AFT SEG	NOZZLE/CASE JNT	AFT DOME	183.8	NOZZLE TO CASE JOINT FIXED HOUSING - LACK OF GREASE
05-02	00	AFT SEG	N/A	AFT DOME	0-120	AFT DOME INSULATION
05-03	00	AFT SEG	N/A	AFT DOME	120-240	AFT DOME INSULATION
05-04	00	AFT SEG	N/A	AFT DOME	240-0	AFT DOME INSULATION
05-05	00	AFT SEG	N/A	AFT DOME	215	AFT DOME DEBRIS CUT IN CF/EPDM
T CTR SEG						
491-09	17	AFT CTR SEG	CTR FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
491-08	16	AFT CTR SEG	CTR FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
491-07	15	AFT CTR SEG	CTR FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
491-05	14	AFT CTR SEG	CTR FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION

:G IBER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
) CTR SEG						
)1-04	13	FWD CTR SEG	CTR FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
)1-03	12	FWD CTR SEG	CTR FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
)1-02	11	FWD CTR SEG	CTR FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
)1-01	10	FWD CTR SEG	CTR FIELD JNT	TANG	360	FLAP, CYLINDER REGION, AND TANG
90-10	09	FWD CTR SEG	FWD FIELD JNT	CLEVIS	240-0	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
90-09	08	FWD CTR SEG	FWD FIELD JNT	CLEVIS	120-240	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
90-08	07	FWD CTR SEG	FWD FIELD JNT	CLEVIS	0-120	CLEVIS, NBR INHIBITOR, AND CYLINDER REGION
90-07	06	FWD CTR SEG	FWD FIELD JNT	CLEVIS	360	INTERNAL INSULATION, NBR INHIBITOR, AND CYLINDER REGION
D SEG						
90-06	05	FWD SEG	FWD FIELD JNT	TANG	240-0	FLAP, CYLINDER REGION, AND TANG
90-05	04	FWD SEG	FWD FIELD JNT	TANG	120-240	FLAP, CYLINDER REGION, AND TANG
90-04	03	FWD SEG	FWD FIELD JNT	TANG	0-120	FLAP, CYLINDER REGION, AND TANG
90-03	02	FWD SEG	FWD FIELD JNT	TANG	360	INTERNAL INSULATION AND TANG
90-01	01	FWD SEG	FWD FIELD JNT	FWD DOME	360	FORWARD DOME AND CYLINDER REGION
71-02	00	FWD SEG	FWD CYL/CYL FACT JNT	N/A	165	WEATHERSEAL UNBOND
71-04	00	FWD SEG	FWD CYL/CYL FACT JNT	N/A	210	WEATHERSEAL UNBOND
86-08	00	FWD SEG	IGNITER/CASE JNT	N/A	360	FORWARD DOME AFTER IGNITER REMOVAL
507-01	00	FWD SEG	N/A	FWD DOME	0-90	IGNITER BOOT REMOVED FROM FORWARD DOME
507-02	00	FWD SEG	N/A	FWD DOME	90-180	IGNITER BOOT REMOVED FROM FORWARD DOME
507-03	00	FWD SEG	N/A	FWD DOME	180-270	IGNITER BOOT REMOVED FROM FORWARD DOME
507-04	00	FWD SEG	N/A	FWD DOME	270-0	IGNITER BOOT REMOVED FROM FORWARD DOME
507-05	00	FWD SEG	N/A	FWD DOME	360	IGNITER BOOT REMOVED FROM FORWARD DOME
96-03	00	FWD SEG	N/A	N/A	360	IGNITER BOOT INSULATION
GNITER						
486-01	00	IGNITER	N/A	N/A	0	IGNITER
486-02	00	IGNITER	N/A	N/A	180	IGNITER
486-03	00	IGNITER	N/A	N/A	90	IGNITER
486-04	00	IGNITER	N/A	N/A	270	IGNITER
486-05	00	IGNITER	N/A	N/A	360	IGNITER
488-01	00	IGNITER	N/A	N/A	340	IGNITER CHAMBER FORWARD SURFACE BLOWHOLE

3 BER	PHOTO CODE	SEGMENT	JOINT	SEGMENT END	DEG LOC	COMMENT
8-02	00	IGNITER	N/A	N/A	340	IGNITER ADAPTER FORWARD SURFACE BLOWHOLE
8-03	00	IGNITER	N/A	N/A	340	IGNITER ADAPTER FORWARD SURFACE BLOWHOLE
8-04	00	IGNITER	N/A	N/A	0	IGNITER CHAMBER FORWARD SEAL SURFACE
8-05	00	IGNITER	N/A	N/A	360	IGNITER ADAPTER

END OF REPORT***